Digital Transformation through ERP implementation
Case studies and Critical Success Factors

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Του ΜΑΡΚΟΥ ΜΑΡΙΟΥ

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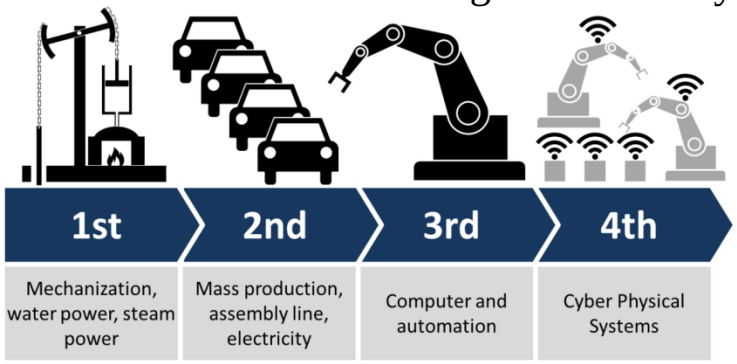
Abstract

The scope of this thesis is to highlight the features that connect the digital transformation of companies with the existing information and communication systems, and especially with Enterprise Resource Planning (ERP) Systems.
At first, through a brief historical review of the 4 different phases of technological evolution that followed the First Industrial Revolution, we refer to the definition, critical success factors, and the importance in the business world of Industry 4.0, by deploying the international scientific literature, papers and publications from some of the biggest companies in the world. Afterwards, following a presentation of the role of ERP Systems and the multiple business functionalities that cover, we refer to the advantages and disadvantages and the level of evolution that they can reach.
Given that the purpose of this thesis is the importance of ERP Systems in Industry 4.0, we present some of the most interesting case studies from international and Greek market. In the end, we end up

with the conclusions of our research and case studies, using some specific Key Performance Indicators along with the Critical Success Factors of Digital Transformation.

Introduction

Nowadays, it is quite known that technology and its implications define our lives in a huge way.
It was only the year 1946 when the first computer, with the name ENIAC, was created by Professor John Mauchly of the University of Pennsylvania. The only goal of this machine was to help the American Army set the range of its new weapons.
Having crossed a long way since then, we have reached in a time that computers and algorithms are an indefeasible part of everyday life. Moreover, technology is a whole science that affects big parts of society, like education, entertainment, security and of course, economy and businesses.
In order to understand the impact of Industry 4.0, we first have to see which changes the previous Industrial Revolutions brought in economy and businesses.



The First Industrial Revolution was the transition to new manufacturing processes in Europe and the United States, in the period from about 1760 to sometime between 1820 and 1840. This transition included going from hand production methods to machines, new chemical manufacturing and iron production processes, the increasing use of steam power and water power, the development of machine tools and the rise of the mechanized factory system.

The Industrial Revolution marks a major turning point in history; almost every aspect of daily life was influenced in some way. In particular, average income and population began to exhibit unprecedented sustained growth.

The Second Industrial Revolution, also known as the Technological Revolution,[1] was a phase of rapid standardization and industrialization from the late 19th century into the early 20th century. The First Industrial Revolution, which ended in the middle of 19th century, was punctuated by a slowdown in important inventions before the Second Industrial Revolution in 1870. Though a number of its events can be traced to earlier innovations in manufacturing, such as the establishment of a machine tool industry, the development of methods for manufacturing interchangeable parts and the invention of the Bessemer Process to produce steel, the Second Industrial Revolution is generally dated between 1870 and 1914 (the beginning of World War I).

The period from 1870 to 1890 saw the greatest increase in economic growth in such a short period as ever in previous history. Living standards improved significantly in the newly industrialized countries as the prices of goods fell dramatically due to the increases in productivity. This caused unemployment and great upheavals in commerce and industry, with many laborers being displaced by machines and many factories, ships and other forms of fixed capital becoming obsolete in a very short time span.
In the second half of the 20th century, a third industrial revolution appeared with the emergence of a new type of energy whose potential surpassed its predecessors: **nuclear energy**. This revolution witnessed the **rise of electronics**—with the transistor and microprocessor—but also the rise of telecommunications and computers. This new technology led to the production of miniaturized material which would open doors, most notably to space research and **biotechnology**. For industry,

this revolution gave rise to the era of high-level automation in production thanks to two major inventions: automatons—programmable logic controllers (PLCs)—and robots.

1. Industry 4.0

The phrase Fourth Industrial Revolution was first introduced by Klaus Schwab, the executive chairman of the World Economic Forum, in a 2015 article in Foreign Affairs. It is also known world-wide as **Industry 4.0.**

Inevitably, the genesis of Industry 4.0 has begun with the emergence of Internet and is the trend towards automation and data exchange in manufacturing technologies and processes which include cyber-physical systems, the internet of things (IoT), industrial internet of things (IIOT), cloud computing , cognitive computing and artificial intelligence. Industry 4.0 focuses on the establishment of intelligent products and production processes. In future manufacturing, factories have to cope with the need of rapid product development, flexible production as well as complex environments.

Since, nowadays, the impact of technology is enormous and the interconnectivity between countries, organizations and businesses has become a simple process, there is a highly increasing necessity for using automated products and tools, cloud-based software and artificial intelligence. So, from one perspective, it is mostly the globalization that caused the last Industrial Revolution.

Industry 4.0 already affects significant parts of the society, but its development is highly aiming to the following four aspects:

1. **Factories.** With recent developments that have resulted in higher availability and affordability of sensors, data acquisition systems and computer networks, the competitive nature of today's industry forces more factories to move toward implementing high-tech methodologies.
   Although, a recent survey indicated manufacturers are having trouble finding real ways to join the Fourth Industrial Revolution, there are plenty of other manufacturing companies that have exploited some of the significant advantages offered. These companies have perfected the use of data analytics in order to cut costs and gain more operational efficiency. Also, with the use of Digital Twin (a digital replica of a living or non-living physical entity), they can cut the time for repairs in an important percentage.
2. **Customers**. The purpose of previous Industrial Revolutions was mainly to cover some standard human needs, because back then many products or services that we have used to consume and are inevitable for our daily routine, were not so common. But, Industry 4.0 is highly aiming to create products that are going to offer new experiences to customers. Also, according to a Deloitte's recent study (Industry 4.0 engages customers), customers may have a continuous interaction with the company and customize the whole buying cycle of the product. The age of manufacturing products in bulk and waiting for customers to buy them, are becoming lost in the past as consumerisation changes demands and increases individualization of customer needs (K3 Syspro, How to manufacture a smarter factory,2015)
3. **Business** Industry 4.0 digitizes and integrates processes vertically across the entire organization, from product development and purchasing, through manufacturing, logistics and service. All data about operations processes, process efficiency and quality management, as well as operations planning are available real-time, supported by augmented reality and optimized in an integrated network (Pwc , 2016 Global Industry 4.0 Survey).

1.1 Definition of Digital Transformation

The digital transformation is defined as a social phenomenon (Stolterman et al., 2004) or cultural evolution and for companies as an evolution or creation of business model (Zhu et al., 2006 ; Rogers et al., 2011 ; Kohli et al., 2011 ; Liu, 2012).
Indeed, it is perceived as a fundamental transition of society, driven by generations called “digital” (including Generation Y, born between 1980 and 2000, and Z, born from the 2000s), for which digital technologies are deeply rooted in their culture and daily practices. In this context, companies must be able to adapt themselves by changing their business model or develop a new one.
Digital transformation starts with the adoption and use of digital technologies, then evolving into an implicit holistic transformation of an organization, or deliberates to pursue value creation.
The concept of digital transformation is formed by the merger of personal and corporate IT environments and encapsulate the transformational effect of new digital technologies such as social, mobile, analytical, cloud technologies and the Internet of Things (White, H.C.,2008).
The depicted idea of digital transformation shows that its multifaceted nature exceeded the level of past transformations endowed with IT capabilities, new transformations. This is upheld by the fact that DT is viewed as one of the real difficulties in all industries lately, without exception, and even in spite of the fact that organizations perceive its fundamental significance, they still confront numerous obstacles that repress them from starting, not to mention profiting by, digital transformation (Schuchmann, D., Seufert, S, 2015).
Digital transformation is a more mind boggling kind of technology enabled business transformation, which needs to address the vital jobs of new digital advances and capacities for effective digital development in the digital world (White, H.C.,2008).

There are existing different conceptualizations for Digital Transformation, which allow categorize the DT phenomenon due to three aspects (Kamila Jurgielewicz, 2019):

1. Organizational – whereas organizational processes and their idea, value creation, business models and extended supply chain are concerned as main aims of change brought by the DT. Business is driven by collected information, which is analyzed and translated into actions. Main aspect of the organizational changes is improvement and change of the existing processes and make them smart.
2. Technological – which stands for introducing novelties in technologies and innovations, which use and enables major improvement on quality, efficiency and revenues. The technological aspects of implemented digitization are already performed and this is strongly influencing on business, public sector and society's life. Robotic Process Automation (RPA) is progressing. Main of the automation trends is the remote management of the infrastructure and given by this ability to consistent investigation and predictive problems detection and solving. The latest observations of RPA implementations are at first line resulting on standardized process, service desk operations and monitoring of networking devices. All due to scalability from human resources to handle short-term demand. As Robotic Process Automation brings more tech-advanced solutions to businesses around the world, operating models that adopt automation, whether by cost center or offshored, improve service and/ or product quality and bring operating time savings.
3. Social – resulting on networking, communication channels, customer models of demands and creating new experience and mindset among customers. The source of data derived from mass media, applications and everyday use devices, giving unlimited information within which use technology might improve and strongly influence on daily life. The way society demands evaluate is illustrated by major changes in customer experience.

1.1.1 Industry 4.0 and the effect on business strategy

According to Pwc's 2018 Global Digital Operations Survey, Industry 4.0 encompasses end-to-end digitization and data integration of the value chain: offering digital products and services, operating connected physical and virtual assets, transforming and integrating all operations and internal activities, building partnerships, and optimizing customer-facing activities.
Not all businesses are able to thrive in the digital era, and those who have already succeeded or try to, usually follow the steps that are highlighted by Esade (7 Key Recommendations on implementing an Industry 4.0 strategy,2019):

- Business scope
- Open mentality
- Define the competencies
- Recruit and manage talent
- Carefully and thorough selection of business partners
- Adopt an ecosystem perspective
- Begin with pilot projects

In an interesting survey around Swiss industrial firms, 40 percent of them admitted that the absence of a strategy prevented them from realizing Industry 4.0 (Ricke/Knell, 2019).
But, since we mentioned the lack of a well-organized and structured digital strategy, it is useful to give an understanding definition and analyze the critical parts.
A simple definition of digital business strategy is that of organizational strategy formulated and executed by leveraging digital resources to create differential value (Bharadwaj, El Sawy, Pavlou, Venkatraman, 2013). The first and most important target for a company formulating its strategy is to achieve a high market share. For those companies which try to settle in the Fourth Industrial

Revolution, differentiate and adjust to the impact that the new technologies have in the business world, there are some key elements that digital strategy comprises and need to focus on (Ricke/Knell, 2019).

1. The analysis of own competencies and technologies along with customer requirements and ecosystem
2. A vision of specific objectives focusing on customer experience, process automation and digital business models
3. Define the paths of action and activities that will format the strategic portfolio

Without a doubt, it is quite hard for the board of a company to transform the strategy and reset the business priorities from one day to another. The process will be ongoing and needs to be controlled and re-updated. But, there are some critical success factors which may show the direction and lead to the desired results. Prior to further analysis of the most important Key Success Factors, it is useful to present the significance of three features the board of a company needs to absorb in order to reinforce the attempts for successful implementation.

- **Agility**. Agility is a powerful pillar to leap digital transformation and enable the business to unleash its full potential. Organizational agility is about to create and react to changes. It is about to take into account any change in the environment and transform the organization to survive, grow, and transform. It is about to respond to emergent events proactively. It is about to transform the whole organization to create a "Lego" like environment that you can change as you need effortlessly (The Rocky Road From Doing Agile to Being Agile,Pearl Zhu)
- **Adjustment**. Efficiently adapting to digital transformation will help businesses connect with their valuable consumers (Adapting to digital transformation, Neeraj Kumar, 2018). Therefore, for keeping or enhancing the market share into the globalization economy, it is significant to adjust, keep up with the trends and try to be innovative following these trends.

- **Culture.** A culture conducive to digital transformation is a hallmark of maturing companies. These organizations have a strong propensity to encourage risk taking, foster innovation and develop collaborative work environments (Strategy, Not technology, drives digital transformation-Becoming a digitally mature enterprise, 2015). Digital culture is beyond than a unique feature. It is an aggregate of other features, attitudes, talents and skills. So, the creation of a successful business environment which will enable the appearance of the futures mentioned above, may lead to successfully implemented digital transformation.

1.1.2 Critical Success Factors of digital transformation

The successful implementation of digital transformation guarantees that the investment won't be useless and the valuable resources that could be directed to other corporate needs, actually help to achieve companies' goals. Also, it may affect their long-term development through the improvement of the financial rates and the upgrade of human capital. And that's because the new industrial revolution requires higher skills from the employees and whenever businesses acquire those skills and talents, automatically have great advantages.
In order to have a successful digital transformation, we need to point out some **Critical Success Factors** and also analyze some interesting case studies from that field in the last few years. But, each one of Critical Success Factors consists of smaller data.
Further down, we are going to present a chart that includes the four most important dimensions for an improving customer experience (Sahu, Deng, Mollah, 2018).

- **Having the organizational capabilities and mindset to ensure that the investment in new technologies will give good results**

The early stage companies fall in a trap: focusing on technology over strategy. What they most want is to improve the customer experience through digital transformation.
On the other hand, the maturing ones try to focus on the consequences to decision making and innovation
Keywords: **agility, adaptation, adjustment**

The above three are the key-points of imposing digital innovation in a company and not only the technology skills. The skills can be built upon a few hours through some online courses and seminars
Not only the companies but also (maybe even more) the employees are more afraid of taking significant risks in the way they work. Managers and executives have to convince them to be bolder.

- **Collaboration among employees**

Many companies changed their culture after implementing innovative technologies (social media)
But in the most cases, digital transformation must line-up with the existing corporate culture
Technology skills aren't the most essential part of driving the change in a company. The really important issue is knowing the business and influencing the organization

Three key trends that will impact digital strategy going forward as well as the leadership approaches and cultures needed to support them:

1. Share common ground between online and offline experience. For example, the MET (Metropolitan Museum of Art) aims to create a thrilling experience in its building but also to get people stay connected through social media

2. Infusing data into processes. Business reports have shown that the data exploitation from social media can lead to significant changes in managerial decisions and operations
   The sell-by date of business models will reach sooner. The disruption that innovative companies (such as Uber or Airbnb) have initiated show the way of new models which aren't based upon ownership

1.1.2.1 Analytics

The analysis starts with the dimension that has the biggest scientific background. According to INFORMS, **Analytics** are described as a scientific process of transforming the received data into valuable information aiming on better decision-making from the board.
Analytics are often be confused with the term of Analysis. Both of them focus on events from the past but the main difference is that Analytics search for the reasons of the event and how the companies can exploit this knowledge and improve their future plans (Wikipedia).
In today's complex business environment, the field of data analytics is growing in acceptance and importance. It is playing a critical role as a decision-making resource for executives, especially those managing large companies. According to a senior executive overseeing analytics at a global firm, analytics must be able to do three things: solve a problem, be predictive, and be implementable. Organizations large and small are tapping data to better understand and improve their operations, financial models, customer relationships, supply chain, workforce, business opportunities, and competitive standing. While data may not be replacing common sense and gut instinct as a decision-making tool, it is becoming an irreplaceable strategic weapon in the corporate arsenal. (The Analytics Advantage, Deloitte, 2013)

The exploitation of the advantages that data analytics offer is not a default and standardized process. Each company has to set clearly its goals and set them carefully to the existing IT department. In addition, a strong business analysis is necessary in order to define the internal and external advantages and threats.
Analytics are more than just handle businesses' data and produce some information and results for better decision making. They include a variety of tools like **predictive marketing, forecasting analysis** (both of them extract results about the trends that are going to show up in the future) and also **analytics based segmentation**. Its purpose is to segment different teams of data according to a predefined content for the most efficient analysis of consumers' preferences and needs.

1.1.2.2 Business

PwC published a report in 2016 about the characteristics of Industry 4.0 and pointed out that digital transformation in business is led by three key factors.

1. Digitization and upgrade of internal processes. New technologies have a significant role from formatting the product or service until logistics and transportation.
2. Product and service digitization. Customers tend to buy a product or service according to the value proposition that is offered by its company. Thus, the innovative ideas and the attempt to offer something with extraordinary and even unique features is an important success factor.
3. Digital business models. It is high critical for a business to turn its business model into a new, more effective one. With the valuable assistance of technology such as new and dynamic invoicing models and globalized information systems, companies may reduce their administration costs.

Technology-leaders like Microsoft have done researches in different geographic areas in order to record separate cases of implemented digital transformation based on the business ethics and the way it is done.

Based on Microsoft's 2018 (A Guide to the Future) which is a report for the digital transformation, some critical conclusions have been emerged about the strategy and implementation in countries of Central and Eastern Europe.

First of all, it’s necessary to point out the views of the correspondents of the survey. The questions asked focused around:
a) The importance of DT for companies in CEE
At least 75% of the correspondents from different industries stated that they expect even a moderate disruption. Also, more than 80% of them recognize significant growth opportunities through DT
b) The approach of the organizations regarding DT
Around 70% of those asked consider crucial the role of IT departments for their industries.
c) The advance of business in their DT journey
Although the most active unit during the DT journey is still the IT, the importance of cross-departmental projects and C-level leaders in the initiation of upgraded technology ideas starts to rise up. Speaking by numbers, in some industries like retail around 40% of the initiators are C-level leaders.
d) The role of the IT department during the transition
As it mentioned above, many organizations recognize the importance of a highly experienced and innovative IT department.

Across industries, though, there are different opinions for the role of vital technology solutions like cloud, artificial intelligence and data analytics. In specific, the percentage of the organizations from manufacturing industry stated that they plan to precede in significant technology investments ranges between 9%-25%. On the other hand for the FS industry the percentage ranges between 29%-71%

1.1.2.3 PwC's report upon digital transformation and findings

PwC's 2016 Global Industry 4.0 Survey explored the benefits of digitizing your company's horizontal and vertical value chains, as well as building your digital product & service portfolio
In this survey, 4 points were found to be critical for the successful digital transformation:

- Incremental and revolutionary product & service innovation
- A strong commitment to invest
- Focus on people and digital transformation
- Digital trust

Focusing on being competitive, big companies worldwide try to increase the number of digital products and services in their portfolios. The plans are very ambitious and aim both to a significant reduction in costs and also to higher revenues. The reduction in costs could be accomplished with the

digitization of horizontal processes and the higher revenues by approaching more empowered customers because the first movers are willing to use advanced tools to have advantages over competitors.
But to make all these happen, it is of primary importance to foster a digital culture inside the company driven by clear leadership from the C-suite.

1.1.2.4 Digital Transformation in Greece

In 2018, Deloitte and the Federation of Industries in Greece published a report that analyzed the current situation around technology in Greece. It mainly focused on the negative points and the delay on the implementation of technology in critical areas of the Public Administration and the Private Sector.

Although the investment on telecoms is high in comparison with the rest of EU countries, on the other hand, Greece seems to lag behind in digital mature.

In order to get closer with the digitally developed countries in EU, there has to be a major strategy plan both from Public Administration and Private Sector.
The areas that Greece comes closer with the EU rates are the following:

- Use of ERP Systems from an extensive percentage of companies

- Knowledge of and familiarity with Big Data and Analytics tools
- Internet Marketing and Social Media are used from many companies even small-medium ones

On the other hand, as already mentioned, there are serious disadvantages on several areas:

- Use of smart devices from the employees in the majority of companies
- Familiarity with services on cloud
- Delays in the implementation of e-invoicing

It’s also worth mentioning the fact that Greek companies spend a big percentage of their budget on the upgrade of back office services and communication systems, even though these are only the requirements of moving forward to the new digital era.

1.1.2.4.1 Digital Transformation and HR Management

Digital transformation is no longer a niche interest as it jumps out of the tech department and into the boardroom of leaders across industries, sectors and geographies. The current digital age is but a stepping-stone in the evolution of a world enabled by the exponential use of technology in the workplace.

The digital age is moving at such a fast pace that it is fundamentally transforming the way organizations operate, be it in the private or the public sector, and is requiring them to develop new ways of thinking about service delivery that influence the way operating models are designed. Hence

the profound effects on the functions of the Human Resources (HR) departments in these organizations and their role in identifying new approaches to managing people.

Prior to initiating the transformation, the leadership team in any organization must align its thought as to what digital means to the organization and how it will fit into the overall business model. This alignment will shape the digital operating model of the organization that is composed of aggregated future state digital capabilities (i.e., processes, people and technologies). It is HR's role to map the future required digital capabilities and where they should be executed in the organization.

After defining the capabilities required, HR needs to support its organization in linking those capabilities to specific roles and responsibilities. HR would need to follow a structured (yet agile) process covering mainly the following activities:

– Evaluate the amount of work associated with each capability.
– Determine roles needed based on the evaluated amount of work.
– Define roles and responsibilities allocated to unique positions.
– Determine proper span of control that allows for effective, lean and scalable management.

Following the phased approach of mapping capabilities to roles, HR needs to design an organizational structure that aligns with the said organization's strategic objectives. Based on the designed future structure and positions, HR is then required to assess the gap in talent between the current and future roles and identify creative ways to bridge any gap.

1.2 Covid-19 and Digital Transformation

Over the past two months, several countries across the world have experienced various forms of remote work and distances learning as governments were coming to grips with COVID-19. Quarantine, lockdown, shelter in place, countries gave this isolation different names, but this time was characterized by the same need to transform many businesses from retail to education.
Driven from the world-wide effect of the pandemic and the need for "a new normal" in the way they operate, the majority of businesses globally have been forced to decentralize the workforce and shift towards online.
In this new reality, big and small-medium sized corporations are seeing important disruptions in many levels.

- Work experience: The need for remote working speeds up the plans to modernize the outdated and overwhelmed technology in order to sustain business. The companies that have not already establish systems that suits with digital work may have significant difficulties in keeping up with the competition and even execute their daily workflow.
- Customer experience: The outburst of pandemic forced all the companies to reduce or even cut-off in-person customer interactions. Many companies had already developed contactless buying experiences and processes but for the others, is a real challenging point to manage to shift to digital because that transition demands proper actions, instant strategy plans and fast implementation.
- Lack of capital: Though big corporations are able to adopt measures to face any possible lack of capital, like banking loan or cutting off fixed and variable costs, small businesses do not have the same flexibility. So, one feasible solution which can help them from closing their doors is to adopt digital processes which can give multiple solutions especially regarding the reduced costs.

Therefore, in order to manage the disruption and either growth or even stay alive into this special occasion, big and small-medium sized companies need to adopt digital tools in their everyday routine. These solutions can be implemented in everyday communication (Google Teams and Hangouts), contracts closing (HelloSign) and data storage (Dropbox and Google Drive).
In the normal course of business, digital transformation is forward-thinking. In today's COVID-19 environment, digital transformation is survival.
To adapt to our current environment, which essentially mandates partial, if not full remote work and business, companies must develop digital processes and use new technologies to enter digital transformation. However, this is not just for the time being as we work through the pandemic. Expectations from all sides—customers to stakeholders—will forever be changed, as they see and experience businesses that are providing top-notch digital service and succeeding in this environment.

Since we mention the impact that the pandemics has on the digital shift of many companies, it could be crucial to see the ways that digital transformation may affect the sector of health and the positive outcomes during a significantly crucial period.
According to SEV and Deloitte's Report on Health, digital transformation expand the field that health services can reach, creating a new healthcare way from the hospital until patient's place.
In this research is mentioned that the EU countries which have adopted digital solutions, already have significant benefits. Some of the most important of them are presented below:

- Improved quality and effectiveness of hospital services
- Reduced hospitalization cost
- Reduced length of hospitalization
- More accurate diagnosis

- Easy anytime and anyplace access to system and personal data

Influenced by the above positive consequences, The Digital Transformation Observatory of the Hellenic Federation of Enterprises (SEV) presents 6 interventions for Health 4.0:

1. Interoperability in data and information exchange between private and public hospitals and health organizations
2. Creation of patients' EMR (Electronic Medical Records)
3. Creation of a database for taking advantage big data and analytics tools for prediction models and budget planning
4. Use of modern CRM systems in public hospitals
5. Remote health services for emergent cases with priority to the extension in smaller cities and Greek countryside
- Full implementation of electronic prescription

1.3 Humanistic approach of Digital Transformation

The current digitization provides opportunities for industries for their digital transformation (World Economic Forum 2018), and also impacts all facets of human society
Because of the widespread of computing, the increasing presence of AI in work environment and people's lives, and the commoditization of digital transformation, human society will become increasingly reliant on data and technology.

First of all, due to the technological changes and their huge impact on societies, there is a need for updating laws in order to protect citizens.
Also, to build trust in societies, technology needs to be secure and reliable, and its designs must reflect the shared values between all the connected parts, like designers, governments, companies and citizens.
Because of the impact that AI will have in future societies, tech companies must approach its implementation with ethical and social responsible way. The scope of the implementation has to be more than just the development and profit. It has to reflect the views of the big companies about their whole existence and offer to the world .Technology should enhance fair progress and equal economic growth and not worsen inequities.

2.1 Scope and Historical Evolution of ERP Systems

The scope of this thesis is mainly to highlight the great significance that ERP Systems keep having in the era of extensive digital transformation. So, to begin with, we have to define in full details how important an ERP System is for a company and what are the potentials from possible integration.
The acronym ERP was first used by the Gartner Group in the 1990s to include the capabilities of material requirements planning (MRP) and the later manufacturer resource planning (MRP II) and also computer-integrated manufacturing. ERP Systems did not replace those terms, but instead they came to represent a larger whole which reflects the evolution of application integration beyond manufacturing (Wikipedia).
In 1960's it was important for companies to hold large amount of inventory in order to be ready to cover clients' needs anytime and never stock out. Thus, the limited software packages that were available back then were focused in this need.
Later, in 1970's it became clear that companies could not afford keeping these amounts of inventory and for that reason they had to design a more efficient plan for the control of materials. This led to the implementation of material requirements planning systems (MRP). MRPs were the first ever formal

mechanism that could determine gross and net materials requirements based on the available inventory.
With the increased power and availability of technology, companies wanted to step forward and improve further the advantages of MRPs. So, in the 1980's, MRPs evolved to incorporate their financial systems along with the materials and manufacturing systems, formatting MRP II.
This allowed companies to have a more integrated business system that derived the material and capacity requirements associated with a desired operations plan, allowed input of detailed activities, translated all this to a financial statement, and suggested a course of action to address those items that were not in balance with the desired plan (The Impact of Enterprise Resource Planning (ERP) Systems Implementation on Business Performance, Nishad Nawaz, 2013).
The continuing improvements around material resourcing planning systems led to ERP in early 1990's. Enterprise Resource Planning Systems were the expansion of the previous system to an integrated whole that includes all business modules, covering all the enterprise.
The diagram below gives an accurate image of the impact that ERPs have in an enterprise.


Implements functions of order placement, order scheduling, shipping and invoicing.
Sales
Procurement (SRM)
Maximise cost savings with support for the end-to-end procurement and logistics processes
II
II
Customer services (CRM)
Capture and maintain customer relationships, facilitate the use of customer experiences and evaluate the knowledge management.
II
Analyse data and convert to information
II
Business Intelligence
Focus on external strategies
e-Commerce
II
Production (PLM)
Helps in planning and optimising the manufacturing capacity and material resources. It is evolved from the MRP.
Aims to streamline and gain greater control of the corporate services
Efficiently and sustainably manage the entire asset lifecycle, improve asset usage and cut costs with powerful analytics
II
Enterprise asset management
and others...
Control warehouse processes and manage movements in the warehouse and respond faster to challenges and changes in supply and demand
Distribution (SCM)
Corporate performance and governance
Human Resource
Maintain a complete employee database and to optimally utilise of all employees.
Accounting
Automate any financial operations while ensuring regulatory compliance and gaining real-time insight into overall performance.
II
II ERP II modules

Enterprise resource planning systems are the principal infrastructure of information systems helping an organization to prosper under the present day economic conditions. Successfully implementation of enterprise resource planning systems creates organizational synergy, which provides a stimulus for the development of particularly efficient processes necessary for the success of an organization (The Impact of Enterprise Resource Planning (ERP) Systems Implementation on Business Performance, Nishad Nawaz,2013).
As practice shows, implementation of an enterprise resource planning system frequently does not justify the expectations of an enterprise, costs much more than expected, and its implementation lasts for a considerably longer period of time than planned. An organization has to analyze before implementing ERP Systems and to know the benefits of the implementation (The Impact of Enterprise Resource Planning (ERP) Systems Implementation on Business Performance, Nishad Nawaz, 2013).

2.2 Critical Success Factors of ERP Implementation

In order to make an ERP implementation a success, we need a good scheme. Limited studies were conducted in ERP implementation plans. Most of the studies focus on the critical success factors of ERP success.

1. **Detailed knowledge of the organization and legacy systems**. It is of an immense importance that organizations understand that they need to recognize their business processes for the purpose of fitness between the ERP package and the overall business strategy of the organization. Legacy

systems also have to be carefully evaluated and defined to determine the nature and scale of the problems that the organization may come across during the implementation.

2. **Having a clear and concise strategy.** A company will not be successful during ERP implementation if it does not have a clear list of strategic goals, clear business model and plan and vision.
3. **Having top management sponsorship.** This factor is of immense importance for every large scale project, and especially IT project for one organization. If the top management is not actively backing up the ERP project there is little hope that the project will be successful. Top management is not just involved, but engaged, and the support can come in form of bonuses tied with success or in any other form.
4. **Following top-notch project management practices and process management practices for BPR.** – It sounds very obvious that a project will not succeed if it doesn't follow practices of the project management, as well as that a major project such as an ERP requires business process reengineering to improve the functionality of the software in accordance with the needs of the organization. Organizations should reengineer business processes to fit the software instead of trying to modify the software to fit the organizations current business processes. One of the major benefits of ERP comes from its enabling role in reengineering the company's existing way of doing business, and that to take advantage of an ERP, BPR is a prerequisite. On the other side, project management practices are of mammoth significance during an ERP implementation.
5. **Following top-notch change management practices.** Practice for change management is required since ERP implementation enforces BPR of key processes within organizations. Change management involves the effective balancing of forces in favor of a change over forces of resistance. Thus training and education become imperative in the change management process.

6. **Having a skillful and knowledgeable team composition.** Many authors have identified that the composition of the team that will lead the ERP project implementation should be consisted of people selected according their skill sets and that will be devoted to the project. Inadequate training has shown to be one of the significant reasons of many ERP systems failures. Knowledge, morale and motivation, as well as retention of the skilled members of the team paly a huge role in implementation success.
7. **Creating clear procedures for data entry and accuracy.** It looks like more and more there is a need for validating the data and convert the data into single and consistent format before the system is used. Also, it is significant for the organization to create a data analysis plan, quality control, migration and data cleansing as well as data accuracy.
8. **Conduction training and streamlining the communication.** One of the most recognized CSF for enabling people to work with the system is the training in all levels of the organization. But, besides this, many experts point out the significance of the communication between the teams and the organization in order to accomplish a successful ERP implementation.
9. **Creating performance measures.** Measures of performance for the new system that will be established takes a critical role in ERP implementation success. Successful management of user experiences is found to be related with successful system implementation. Through monitoring and feedback from the users, the performance of the ERP system can be reviewed and evaluated to see whether it is realizing the goals and objectives of the business.

2.3 Benefits of ERP Implementation

The decision of implementing an ERP is always challenging for a company, no matter what its size. It demands a solid project plan which sets the constants and variables that can affect the implementation in the company.
But, before anything else, enterprises have to be familiar with the benefits that an implementation will have. The benefits can be both internal and external (Nawaz, 2013).

Internal:

- Lower operating costs
- Real-time systems
- Increased productivity
- Improved internal communication

External:

- Improved customer service
- Enhanced competitive position
- Increased sales and profits

2.3.1 Implementation of Cloud ERP

Cloud computing has emerged as a popular solution to provide cheap and easy access to externalized IT (Information Technology) resources. An increasing number of organizations (e.g., research centers, enterprises) benefit from Cloud computing to host their applications. Through virtualization, Cloud

computing is able to address with the same physical infrastructure a large client base with different computational needs. Cloud computing is not application-oriented but service-oriented; it offers on demand virtualized resources as measurable and billable utilities (Srinivas Jagirdar, 2013).
According to Klaus, Rosemann and Gable, traditional ERP systems can be classified into two categories: on-premise ERP and hosted ERP.
On-premise ERP, the system loaded and run over the enterprise infrastructure such as servers, network, platforms, computers, etc. The enterprise runs, operates and manages the ERP system according to software license model. Running cost, operational cost and maintenance cost are covered by the enterprise as well as disaster recovery. Hosted ERP can be defined as a service offered to an individual or an organization by a provider that hosts the physical servers and running that service somewhere else. The service is most of the time offered through a direct network connection that may or may not run via the internet (S. Owen, 2011)

2.3.2 Benefits of cloud ERP Implementation (Elmonen, Nasr, Geith, 2017)

- Lower upfront costs: Due to the separation of computing recourses from enterprise location, the enterprises do not need to pay for building the computing environment it just pays for accesses the environment over the internet.
- Lower operating costs: The cloud service providers (CSP) are responsible for operating and providing the cloud services that will lead to isolating the operation processes from the enterprise as well as the operation costs.

- Rapid implementation: CSPs offer wide range of ERP solutions, these solutions can satisfy most of the enterprise needs. Choosing between different solutions and product takes place according to the enterprise business needs. The implementation process accelerated due to this selection process. Scalability: Cloud services are high elastic; the enterprises can scale up or scale down the used resources according to its current needs.
- Focus on core competencies: Cloud ERP systems help the enterprise to manage their business more efficiently and give the enterprise a chance to focus on other concerns related to their core activities.
- Using advanced technology: Working over the cloud allows the enterprise to access and use specialized technology and advanced computing resources that available over the cloud.
- Rapid updates and upgrades: Update or upgrade cloud solutions accomplished faster than traditional ERP application. The CSPs perform all upgrade processes according to the enterprise requests.
- Improved accessibility, mobility, and usability: Applications over the cloud work in an open environment, which increase the accessibility options. The increases accessibility, in turn, increases the usability of the cloud ERP inside and outside the enterprise.
- Easier integration with cloud services: There is a huge number of cloud application offered to satisfy the enterprise's needs. Due to the nature of ERP systems which connects different parties inside and outside the enterprise, the integration with other services becomes easier at the cloud.
- Improved system availability and disaster recovery: CSPs provide well-defined policies and plans for backup, restore, recovery and all other functions that concerned with the availability and disaster recovery.

- Cost transparency: Pay-per-use or subscription models according to enterprise plan. The enterprises pay only for what they use; there is no need for paying what they don't use or what don't cover the enterprise's needs.
- Sales automation: Due to the geographical separation between clients and CSPs, the sales issues could be accomplished automatically over the cloud.
- Using security standards: Some of CSPs implement standards for encryption and decryption, that lead to moving the security issues and effort from clients to CSPs.
- Free trials: Many cloud ERP providers allow the potential clients to try the ERP systems before buying it. These trails increase the certainty of the cloud ERP usability.

2.4 Risks of the implementation

- **Longer implementation time and cost than expected**. It might be difficult to get managers and employees to commit to project management roles because they may be uncertain about what responsibilities will still be open to them once they are transferred back to their positions.

- **Higher likelihood of operational disruption due to bigger business process changes**. It is very difficult in most business to change old or existing processes and to customize the ERP system to fit to current processes is a costly and time-consuming venture.

- **Lack of realization on business value.** Support of top management is crucial for accomplishing projects objectives. It is easy for senior managers to become a sponsor but very difficult to let go the crucial team member for pilot testing or superuser training. The unfortunate fact is the people who need to be trained as “Super Users”, are the same “key” people who run the business. The lack of senior people support to give time away from the desk, as they are too afraid to miss sales, delivery to customer is one of the most common ERP implementation risk.

- **Lack of Ability to Recruit and Retain Qualified Systems, Developers**. Many of the organizations found it difficult to recruit and retain good ERP specialists because the market rates for these people are high. The developers of biggest market share ERP vendors like SAP, Oracle, Microsoft Dynamics are in high demand and moves from one consultancy project to another. So not finding an in-house ERP specialist could be significant ERP implementation risk.

2.5 The role of UX in ERP Implementation

In order to point out the significance of the improvement of user experience in ERP Systems, we will mention a case study of 2 years observation for the migration of management operations of company Grupo Guadiana to another system.
Due to the technological evolvement in Mexico and the requirement for the companies there to handle costs and taxes electronically, the company above had to use a new software with important capabilities and features to adjust it to its current functions and operations
There were some key points that needed to be set up in order to define the right adjustment of the new system:
-Adaptation to business needs
-Process adaptation
-Resistance in any corporate change
The most important and critical part was to define the needs of users and make them adapt quickly to the new system. In cases of system migrations, employees develop a strong resistance to the change because it is hard to convince them to abandon a certain way they work and adopt a new one.
But even though there was some uncertainty in the field of reports generated, the employees got used the new system quickly and thus the time spent for training process was eliminated
In conclusion, it is high critical for an ERP System to handle the needs of a company and its architecture to be solid and stable, not forcing employees to try implement the routines of their previous working systems

2.6 E-business and ERP systems

The way technology affects businesses' daily routines has led them to search for the right solutions to integrate their Enterprise Resource Planning systems. One of the most effective choices is the exploitation of E-business. E-business is defined as "the use of electronically enabled communication networks that allow enterprises to transmit and receive information.

ERP systems are basically backbones of E-business in respect of implementing inter and intra organizational business activities such as order to cash, production planning, financial management, requisition to cash process chains and logistics.

Thus, the basic need to be covered is the interconnection between the automation and standardization of business processes which offered by an ERP System and the flow of data and information that an enterprise receives (regarding customers, vendors and competitors) with the use of E-business networks.

2.7 Digital transformation and ERP implementation benefits and drawbacks

ERP implementations are focused on replacing back office systems. Digital transformations are more focused on delivering breakthrough business value via innovative new technologies – which may or may not be limited to ERP software.

- Technological differences:

In reality, core ERP systems simply replace traditional back-office functions, while true digital transformations leverage a variety of technologies – including ERP – to transform their business models

- Business Processes Management:

ERP implementations typically don't involve major changes – at least not relatively speaking. The changes are significant, but not as significant as those required for digital transformation. In the case of the latter, business operations and business models are changing, which has a larger impact on business processes and operations

- Organizational management:

ERP implementations typically focus on training people to understand how to perform the same transactions in a new system. In the case of digital transformations, the focus is on helping them change their jobs to support new business models and a revamped culture to support those new ways of doing business

- Business Value:

ERP implementations have the potential to deliver a strong ROI, with a payback in just a few years if things go well. However, digital transformations have the potential to deliver exponentially more

business value via enhancements to top-line revenue growth, customer satisfaction, and other benefits that extend beyond the traditional efficiency gains of ERP software.

3.1 ERP Systems towards Digital Transformation

Enterprise Resource Planning (ERP) systems employ highly integrated business software solutions that have existed for many years. Being the base of the IT application landscape of most enterprises, ERP systems remain fairly commoditized and scarcely leave room for differentiation. In view of the major digital transformations currently taking place, the role of ERP systems needs to be reconsidered (Asprion, Schneider, 2018).
A research, which presented in 41st International Scientific Conference on Economic and Social Development at Belgrade, confirmed a framework of five possible Impact options as possible key changing roles which related both to ERP and CRM Systems:

- DT sets new demands on the Enterprise architecture; Design and development of EA is changing due to Digital transformation. The changes are visible in the need for new methods and techniques, as well as in tools for constructing new features or new configurations. EA needs to be more oriented towards strategizing, planning and execution of DT so that the EA meets requirements of changing business. The “updates” of existing languages and tools need to enable value co-creation and modeling (van Gils & Proper, 2018), provide a diagrammatic but machine-readable integration (Harkai, Cinpoeru & Buchmann, 2018), support collaboration of various actors involved in architectural design, and offer methods and techniques for customer experience modeling.

- DT influences the reconfiguration of customer relationship management systems; what happens when digital perfection is achieved, and the results are measured only by numbers? Will the human aspect matter at all? Belleghem (2015) defines four possible reconfiguration options of CRM depending on the digital and human focus. Although digital natives and other generations have different expectations, some operations could be left out of going digital intentionally. On the other hand, customer-centricity is important for DT and it impacts the way customer data is retrieved and used. Customer experience and customer journey management need to be integrated in some way into other CRM processes.

- DT influences the reconfiguration of enterprise resource planning systems; Customer's needs and expectations change quickly, faster than the traditional product lifecycle can handle it; and towards implementing the mass-customization paradigm (Cocca et al., 2018), companies need to accelerate their innovation processes, make their supply chains more flexible, keeping in mind track-and-trace and sustainability issues. Meanwhile resources consumed for generating services and products are more connected, more intelligent, more adaptive, more agile, more responsive, and more predictive, just more of everything. Traditional ERPs can handle only so much of DT customization requirements, calling thereby for reconfiguration of their role. Another important aspect of ERP's role is related to financial potential management and the reinvention of value creation, new revenue streams and new business models.

- DT and related technologies impact significantly data extracting and storing requirements; although challenged in terms of storing masses of unstructured data, but still valuable as data

sources, ERP and CRM systems in combination with IoT, Big data, data analytics are setting new standards on data volumes. Everything is captured, processed, stored and/or shared. Security issues and issues regarding General Data Protection Regulation are important, but for many average consumers of less significance in relation to their need for consummation of services. A good balance of security and mass intelligence is vital.

- DT forces agile front-end and systematic structured cautious back-end subsystems to work seamless as one. Whatever EA defines as most suitable, and whether the Systems of 41st International Scientific Conference on Economic and Social Development – Belgrade, 23-24 May 2019 254 Engagement and Systems of Records are integrated or not, the most important customer demand is the constant availability of services, anytime, anywhere. Vendors offer some range of software solutions or platforms to support DT in terms of integrating front-end and backend systems, enabling vertical and horizontal integration, end-to-end operations across the entire value chain, and other business transformation collaboration models, but this is still in early phases of maturity.

3.2 ERP Evolution

According to Accenture's "Unleashing Exponential Evolution", many enterprises attempt to gain important leverages by implementing cutting-edge technologies. The real challenge they face in this case is that the implementation may start without taking into consideration the core systems of the

enterprise. ERP Systems run critical processes of the enterprise, financials, planning, HR, supply chain and logistics. So, bypassing the core systems can lead to a serious disadvantage: unlocking only a percentage of the company's potential while sowing the seeds for a 'legacy of the future'.
The same report presents some trends around the evolution of ERP Systems which could help a company to direct the digital transformation with a more effective way and with fewer constraints.

1. TREAT CLOUD AS THE GATEWAY TO MODERNISATION.

Cloud technologies and tools are the future, but everyone moves at their own pace - ensuring that all enhancements are compatible with and beneficial for core ERP processes. The process that each company will follow for migrating its functions is different and is based on the specific context and the priorities that are been set from their leaders. So, it is a common practice to begin with some critical functions and then move with the rest.
Software as a Service (Saas) is the best way for the small and midsized companies to migrate on cloud services. But lately, even though they are still cautious, larger enterprises think also of that way (migrating from on-premises to cloud) because the software vendors are specified and experienced enough to demonstrate solutions at the scale these clients need

2. MAKE YOUR CORE INTELLIGENT AND EXTENDED.

Only a few companies worldwide have already managed to transform their core systems from only recording to actually learning and evolving through machine learning and analytics. However, most of them really want to extend their capabilities by exploiting the intelligent technologies.
ERP Systems will evolve and become intelligent through the following two key areas: a) Upgrade and improve the existing processes, b) by enabling and executing new ideas, like predicting and forecasting contracts' expiration or goods consumption.

3. PARTNER WITH CLOUD CAPTAINS, NOT TRADITIONAL SERVICES FIRMS.

As ERP systems adapt to the digital world, IT service providers will need to transition from their legacy operating models and work as part of an ecosystem. Successful system integrators (SIs) will actively co-create and partner with global cloud ecosystems, delivering valuable managed services to customers and managing clients' business across multiple clouds.

4. PERSONALISE

The UX that traditional ERPs offers is arguably considered to be unfriendly, thus the new technologies need to transform ERPs into more personalized and closest to the needs of employees' systems.

According to some findings from Accenture, 41% of businesses use ERP Systems that do not allow personalization of UX

5. AMPLIFY INSIGHTS BY CONVERGING DATA.

Maybe the most important trend for ERP Systems is to deploy the vast amount of data and converge them in a way that they will produce useful and well-rounded insights.

However, a major challenge to the achievement of a unified data view is that large parts of enterprise data is either "dark" (unstructured, not readily usable), disparate (hard to combine) or of poor quality / incomplete.

If companies manage to freed and converge the so-called trapped data with other data sources, may get a really competitive advantage in the market. Harness and use of these data, along with data from other devices or IoT will give benefits to reactions in changes, customer service and new business models.

4.1The role of digital transformation in an existing ERP system-a case study

Consider Sky1 – a leading entertainment company serving 22.9 million subscribers across Europe. Following the merger of Sky UK with Sky Italia and Sky Deutschland, Sky's Group Procurement team, under the leadership of
Fabio Francalancia, Chief Procurement Officer, set out a bold vision: to create a next generation commercial purchasing function, building on a robust and digital focussed capability, by providing leading class tools and processes.

They adopted a three-stage transformation that helped the company transform from the core to the edges. In the first phase, SAP Ariba Sourcing and Supplier Management was implemented for all three countries to create a single
European platform for strategic sourcing. In the second phase, SAP Ariba Contracts was deployed for all three countries, extending the already deployed strategic sourcing capabilities. SAP Ariba Buying and Guided Buying were also integrated with Sky's existing ERP solutions in Germany and Italy.

The third phase saw the integration of SAP Ariba applications with Sky's new SAP ERP on HANA backend system for a streamlined end-to-end Procure to Pay solution. Today, Sky is benefitting from a completely transformed experience that brings together its Procurement and Sourcing functions in a single European solution
that facilitates a simple, smart and elegant buying experience, increases user engagement and drives process, contract and policy compliance.

-The key for big enterprises is to adjust in technology initiatives with boundaries. It is not feasible to change the whole amount of operations and processes every now and then. There must be a strategic plan that will infuse innovation and modernization in current ERP Systems. So, the key here is to evolve and refresh systemically and not drastically change the systems

.

4.2 Case studies of successful digital transformation of ERP systems

AMERICAN AIRLINES:

Company description: It is the world's largest airline when measured by fleet size, scheduled passengers carried, and revenue passenger mile. American, together with its regional partners, operates an extensive international and domestic network with almost 6,800 flights per day to nearly 350 destinations in more than 50 countries. American Airlines is a founding member of the Oneworld alliance, the third-largest airline alliance in the world. Regional service is operated by independent and subsidiary carriers under the brand name American Eagle.

Issue: Inconsistent business processes and multiple outdated systems across HR and payroll were hampering the company's ability to effectively serve and manage records for over 335,000 employees, retirees and non-employees worldwide.

Solution: The solution being offered by both SAP and Deloitte was a unified, global HR system. This system, enabled by SAP SuccessFactors modules and SAP Payroll Platform, drives new digital business processes and enhances the whole employee experince (for more than 335.000 members globally).

Impact: The solution was implemented successfully and offered numerous advantages in the airline company. Some of them are mentioned below:

- Single world-class employee experience across every region and for every team member
- Significant cost savings and efficiencies from migrating to the cloud different systems, processes, records, and support operations across 57 countries
- Consistent and accurate data, global/local functionality, and enhanced reporting capabilities empower the workforce to make improved local and corporate decisions. HR-related payroll errors, for example, were reduced to zero
- Provided integrated employee performance, compensation management, and leadership succession planning capabilities
- Extensible cloud-based technology platform, which enables continuous improvement and new innovation

- Reduced the job candidate application process from 45 minutes to 10, and provided a digital onboarding experience for new employees
- Enhanced General Data Protection Regulation (GDPR) compliance and other data privacy improvements

Alcon:

Description: Alcon is a global medical company specializing in eye care products with headquarters in Geneva, Switzerland, and incorporated in Fribourg, Switzerland. With approximately 7,4 billion dollars revenue in 2019 and more than 20.000 employees worldwide, Alcon is considered to be the leader in eye care. Alcon's American headquarters are located in Fort Worth, Texas. On April 9, 2019, Alcon completed a 100% spin-off from Novartis.[12][13][14] The new standalone company is worth up to 28 billion Swiss francs.

The Fort Worth, Texas-based subsidiary of Switzerland's Novartis AG launched its first e-commerce site two years ago in Brazil, and followed with a site for the United States in November 2016.

Issue: Alcon's customers were saying that they need from the company to make it easier for them to make business with. So, the board decided to search for the best technology tools that could align with company's requirements and standards.

Solution: Alcon started on its digital commerce journey carefully—starting out with a "minimally viable" e-commerce product, but one that had the technical capability to grow internationally and handle digital content and commerce for the highly complex business of marketing, selling and delivering surgical equipment and eye care lenses.

The manufacturer checked out a number of e-commerce technology offerings, and chose the SAP Hybris platform from business software maker SAP SE. The choice fit nicely with the SAP enterprise resource planning system Alcon was already running, but the manufacturer also chose it for the flexibility and ability to scale up to meet Alcon's needs. The SAP Hybris platform has been recognized by technology research and advisory firm Gartner Inc. for having a "microservices agility layer" designed with application programming interfaces, or APIS, that enables Hybris to extend multiple individual applications in ways that better serve online customers.

The integration with Alcon's SAP ERP, for example, provides good support for displaying contract pricing as well as other content personalized for individual customers. Alcon's deployment of Hybris, for which it worked with systems integrator Deloitte Digital, required some customization but incurred no difficulties, she says.

It also provides Alcon with an improved capability for monitoring shipments to each customer, enabling it to better manage automatic replenishment of products as requested by customers.

Impact: The implementation of above mentioned SAP platforms, offered significant and prompt results the company:

- Advanced e-commerce capabilities through the ordering system and new inventory management
- Pull out the mechanical work out of the daily workflow equation and make it easier for the customers to do business with
- Build relations that are more knowledge centric and not just mechanics oriented

doTERRA

Company Description: Since essential oils company doTERRA was founded in May 2008, it has grown to serve three million customers spread across more than 100 countries. Expanding from an initial product line that offered 25 single and 10 blends of essential oils, the company now manufactures and distributes 46 single oils, 26 blends, and another 56 products containing therapeutic grade essential oils. Each of the essential oils the business distributes has been carefully distilled from plants that were harvested by select growers around the world. The doTERRA name, meaning "gift of the Earth," reflects that this array of essential oils and nutritional, spa, and healthy living products would not be possible without its global network of botanical growers and distillers.

doTERRA's business model is a unique one because it follows a direct selling approach that allows individual distributors called "wellness advocates" to work with customers, as opposed to following a mass marketing approach. This model develops a trust relationship between the customer and wellness advocate, which is evidenced by the fact that, after joining doTERRA, 68% of all customers regularly reorder — compared to the industry average of near 10%.

When doTERRA was first founded, it started with an outsourced IT model, running on a specialized system for startup network marketing companies. This system provided order management capabilities — through both web- and call center based channels — from order entry to order fulfillment. It also supported the enrollment of new members and provided the rank determination, commissions, and compensation capabilities from the back end as well. According to Todd Thompson, CIO of doTerra, this was a good fit for the first six years or so to help the company grow and execute effectively. However, they augmented this system with a few other applications for core financials and warehouse management, and we used a lot of spreadsheets.

Issue: By the fall of 2014, doTerra was continuing to grow double digits, but the system started to outstrip its capabilities. Problems such as slow performance and system outages started to emerge and they were becoming even bigger as the company was growing.

From a business driver and strategy standpoint, doTERRA aimed to improve functionality for core business functions — specifically in finance, operations, human resources (HR), order management, web enrollment and commerce, and customer relationship management — as well as enhance analytics for strategic decision making and improved business performance.

Solution: After a rigorous in-office and out-of-office negotiation process, dōTERRA selected SAP as its software provider. The decision was to run one global instance of SAP S/4HANA Enterprise Management, hosted by a managed services provider at an off-site data center

The overall project plan included implementations of additional SAP solutions such as SAP Fiori, SAP SuccessFactors Recruiting, SAP Hybris Cloud for Customer, SAP Hybris Product Content Management, SAP Hybris Commerce, and SAP Hybris Marketing. The transformation project kicked off in June 2015 and is scheduled to be completed by the close of 2020. The timeline was broken down into multiple phases: The first wave went live in April 2016 with the SAP Hybris Product Content Management application for managing static website data — this static website content included over 5,000 pages of information about the company, its products, its advocates, and so on. A month later, the second wave rolled out back-office SAP functionality for finance and controlling, logistics and operations, and HR functionality in the US — and also included an implementation of SAP SuccessFactors Recruiting.

The third wave, which is currently about halfway through development, will go live in the summer of 2017 with SAP Hybris Commerce for online shopping and enrollment in the US, as well as SAP Hybris Cloud for Customer for customer relationship management. At that point, online browsers and shoppers will have a total ecommerce experience at doterra.com — from enrolling as new members to browsing items and adding them to carts to completing checkout transactions — all delivered through SAP Hybris solutions. The final wave is currently in the blueprinting phase for a global rollout of all the solutions, going live starting in the middle of 2018.

Impact: According to Thompson, a big success factor for the project is that doTERRA has been focused on solving a business problem rather than a technology problem. The project team has hung

the set of business drivers on the wall to remind everyone exactly what business metrics they are trying to achieve.

- Benefits from advanced analytics and new reporting capabilities with the use of SAP Hana
- Use of SAP Hybris Commerce for the engaging website that offers easy reach and high quality of information for the products
- Ability to syndicate content into new markets and other languages easily
- New website functionality – from enrolling new brand advocates to selling products directly

4.2.1 Benaki museum and Softone ERP implementation

Description: Established and endowed in 1930 by Antonis Benakis in memory of his father Emmanuel Benakis, is housed in the Benakis family mansion in downtown Athens, Greece. The museum houses Greek works of art from the prehistorical to the modern times, an extensive collection of Asian art, hosts periodic exhibitions and maintains a state-of-the-art restoration and conservation workshop. Although the museum initially housed a collection that included Islamic art, Chinese porcelain and exhibits on toys, its 2000 re-opening led to the creation of satellite museums that focused on specific collections, allowing the main museum to focus on Greek culture over the span of the country's history.

Issue: The board of the world famous cultural center of Benaki Museum had to confront many serious issues with the lack of interoperability between internal systems and departments, low efficiency of functions and jobs and zero financial reports and references. All these used to create serious management problems and significant delays
in decision making.

Solution:

By implementing SoftOne ERP the Museum managed to interconnect all departments and handle all the everyday activities and tasks, such as:

- Higher level of control for costs and revenues per department or business unit
- Handling the events of the museum and keep online tracking of their performance based on important rates like profitability
- 24 hours system operation with the connection between ERP and business portal

But the most important benefit is that (with the scientific guidance of PwC) the cultural center uses integrated BI tools, reports and dashboards in order to have accurate and reliable statistical analysis which can lead to faster decision-making.

Impact

The migration to a whole new platform, even though it seemed costly enough and in demand of important business resources and time moved the museum forward to the digital transformation era. By exploiting the default advantages of an ERP System and combining them with the advanced technologies that BI tools offer, the board has managed to:

-Improve the visitor’s experience

-Lower the operating costs and cut off the unnecessary budget for IT investments

-Increase the level process control and limit the errors

-Have real time access in data

-Get accurate business reports and statistical analysis

4.3 Action Case Studies for testing CSFs and KPIs

The objectives of the action case studies were: a) to test the applicability of CSFs and KPIs for each stage, b) to test the project progress reporting and c) the acceptance of the implementation of new technologies in the existing ERP systems.

For the purposes of our research, an action case study was performed, in order to test an evaluation method across different situations, systems and company sizes. The company and its project information are presented in the following table. Company A represents an implementation of an innovative application into an existing ERP system in order to speed up the process of general entries registration.

Size of the company	1200
Business Nature	Advisory Services
ERP package	Softone
Project Nature	Enhancement
Project Starting Date	October 2018
Project end date	Augoust-2019
Live-run Performance	Satisfactory
Reasons as a case company	A large-sized company to enhance an existing ERP System with a new application

Company A, headquartered in Athens, Greece, offers professional business services. In October 2018, its Advisory department which already used a Softone EPR System mainly for clients' bookkeeping, decided to invest in a new technology of a Greek startup company. First, the goals and objectives of the next year's business and operations were defined by the management as follows

- Cost to be reduced by 10%;

- Time spent for data entries to be reduced by 10% and
- Revenue may grow 5-10% percent annually.

To measure the success of the above mentioned digital transformation strategy, the long-term plan must be divided into small projects with specific KPIs, which answer the above questions and many others. Normally we will take into account traditional indicators of revenue, costs and customer satisfaction, but much more is needed. Very broadly these can the most significant KPIs to consider:

-Focused on the organization

1) Level of participation and positioning of the organization in the market
   Given the fact that the company that we have made the research is considered to be one of the biggest in world-wide scale to the professional services sector, the weight of this indicator is high enough and very important for the analysis.
2) Level of digital maturity, training and experience of partners, employees and management
   The answers from the people we asked showed that there is a sufficient level of digital maturity in the company and the people involved in the project, from partner to associates, showed high adaptability and a positive attitude for the upcoming change. The training period for the induction in the basics of the new application was not long enough, because the familiarity with digital tools was high enough.
3) Percentage of revenue from digital channels
   The long-range plan of the addition of the application to the existing ERP System is to constitute an attracting tool for the potential customers and also an extra adjustment for the current ones which will give benefits for them and an additional revenue stream for the company.

4) Improved user experience
   One of the most important reasons for the addition of the application was to make the workflow and processes even better in terms of the quality and quantity of the everyday tasks. Regarding the quality, which is measured mainly by the way that the application and ERP System connected, managers told us that although they still can't reach the perfect 100%, the efficiency may easily reach a 90% with the potential to get higher. By the perspective of quantity results, the main target was the increase of number of general ledger entries that are registered within an hour. It's worth mentioning here that the application is far more effective when it comes to a large amount of documents, more than 30 to be scanned in an hour.
5) New customer acquisition rate
   Since the application is implemented internally for the initial phase, the acquisition rate has not been fully estimated.
6) Change in customer/user behavior
   The main philosophy of the implementation was from the first moment to digitize the process and the workflow and upgrade the role of the employees from the registration of general ledger entries to the better preparation and handling of business reports.

5. Conclusions

Having already crossed a nearly 50-year route into the business world, ERP Systems are now thriving to be aligned with the digital evolution, innovative ideas and cutting-edge technologies. Following our academic research and the available literature, the key-point for the upgrade process of ERP Systems begins with the strategy that the top management decides to follow. The strategy needs to be accurate, target-oriented and well-structured because the transition to an evolving business system will absorb significant resources for the company. Also, it is high critical for the successful transition to fully prepare the employees and if necessary to provide courses and other training tools for better compliance. Along with the preparation of the employees, a company needs to have a reliable and high skilled IT department to be engaged with the whole project and deliver it on time and with high quality standards.

But, in any case the companies that decide to invest in new technologies for the evolution of their ERP Systems, have to be absolutely sure about the advantages that will gain because a not well studied implementation or addition, could cause multiple negative effects: huge budget spent, lower system performance, complexity among employees about the new roles and tasks.

The final part of the implementation or addition has to include important metrics and key point indicators, because this is the way to get a periodic feedback, adjust budget, human resources and policies and generally oversee the process and get decisions for its adjustment to the daily workflow.

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