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Digital challenges of Accounting

1. Introduction:

Accounting is an essentially required operation for every company around the world. Companies record and report their transactions for further analysis for numerous end users. Governments need firm’s past performances to calculate taxes. Management of businesses use the quantitative results for decision making. Suppliers analyse cooperation opportunities based on possible partners competiveness. Lenders decide about investments based on past monetary performances of subject companies.

Financial divisions of companies focus on the allocation of resources based on the periodic reports from the accounting divisions. These fields include a large number of sophisticated processes that were already done for long period of time by accountants and financial experts.

However, in the past few decades we had the chance to witness an extremely intense technological advancement. At the beginning, scientists could not even imagine that it is possible to make computers basic parts of every average household in such a short period of time – the first mass-market computer, the Programma 101 was introduced in 1964. Just a bit more than a half century, and computers became essential in day-to-day operations for businesses, from large multinational companies to local businesses. This is already a global phenomenon – to achieve the average effectiveness of any industry’s competitors, it is a key requirement to include computers in the picture anywhere in the world. The pace of change is growing exponentially year by year, innovation is more crucial than ever before.

Until the age of computers, office jobs were entirely done by pen & paper. It was much slower, less precise, and overall less effective. The basics did not change: accountants and financial experts perform lot of calculations. The largest change in the office environment is that now every employee uses a personal computer to work with. It requires everyone to learn a new set of skills to use the basic programs and tools. This digitalization changed the whole string of everyday tasks and invented new methodology to perform all the processes from the past and also replaced a huge number of employees – now requiring less people for higher workload.

The largest companies in the world may operate in more than one hundred countries, their businesses are growing in complexity and size. Hundreds of financial tools (software’s, ERP’s) can be in use for very different purposes, but correlating. This
is one strong reason why the financial and IT experts must work closely and understand each other, while they are coming from a completely different scientific background. It can be about managerial reporting software, which are used to deliver key figures to higher level employees (e.g. Hyperion, MARS). At this case they analyse key figures across the organization and make precise decisions based on reports, which are coming from thousands of intercompany accountants, who did their work in completely different systems, and report their results through several software’s.

The cooperation of a CFO and CIO (Chief information officer, IT director) is just the top of the iceberg. Typical employees within a financial department always use specific financial tools for booking any entries or for gathering information if they need to analyse ledgers, numbers, data sets etc. It is important that these software’s always align to the requirements of current circumstances: the same system may operate differently from company to company, and also, in restricted countries (e.g. in Russia, where accounting principles differ from the US G.A.A.P.) special methods are also required. The technical part of this alignment is implemented by the IT support staff: they work together with finance experts to understand their current obstacles, always try to stabilize the systems, look up issues, possible source of problems and opportunities for simplification to save a lot of time, energy and money. There are special “simplification teams” in many large companies. These teams have a knowledge mixture from IT and Finance.

In this paper I focused on the Accounting and IT challenges that globally operating Companies face. I have spent 20 months at General Electric in different positions in the Finance department, in one of the largest Global Operation Centres, located in Budapest (Váci Greens). It helped me a lot, to expose myself to the subject challenges. While I was an accountant, I already faced plenty of IT issues that required me to cooperate with experts from other teams. I learnt a lot about the applications in use internally (there were more than 400 within the company).

I organized interviews with SME’s (subject matter expert – it is their responsibility to handle both accounting and IT related simplification projects), experienced accountants and financial experts to get a deeper and wider understanding of the processes, and choose the best cases for further analysis. I planned to investigate not only intercompany specialists, but also external IT specialists, who spend several months working on projects and bring their new methodology to the firm.
The following points are in focus:

**The externally and internally developed ERP’s in use:**

I find it important, to explore most of the relevant systems in use and explain, how they interact – there are internally developed examples (e.g. IBS, OneBiller), but we can find external systems in the same company (e.g. Oracle, SAP). Through the example of GE, I would like to show why it is important to develop intercompany systems, and discover what was the goal, and when did they decide that it is more advantageous to self-develop, instead of using external ones.

**Unharmonized processes due to large amount and complexity:**

At the case of large, multinational company’s mergers and acquisitions result in extreme difficulties in the first few years for IT and Finance-Accounting specialists: from the two or more companies’ totally different methods and systems are coming that always need to be changed, harmonized e.g. to reduce the amount of probable double work. For instance, GE’s merger with Alstom in 2014 is a very rich source for this topic: the general idea was to implement GE’s solutions, but Alstom had very effective systems in use. This way, there are now investigations on the possibilities to improve GE’s processes. The harmonization is still an ongoing process for ex-Alstom entities, due to the large size and complexity of work required.

GE is also unique from the aspect of the diversity that it represents. It operates in Power, Water, Healthcare, Oil & Gas etc. businesses in more than 180 countries. The different businesses also require different processes. For example, BHGE (Baker Hughes, a GE company) is listed separately on the stock market, representing results separately.

**Current challenges due to the large number of applications:**

The high number of systems may confuse most of the new joiners at multinational companies, but there are always strong reasons behind the usage of all the tools. There was a point in 2016, when General Electric operated its accounting functions by using more than 500 applications. This number has been since reduced to 136 by the effort of IT and Accounting expert’s cooperation. There is a plan to achieve the number of 40 in the upcoming few years. There are companies that do not reflect the
same situation. In the office of IBM in Budapest, there are less than 10 applications in use. Both companies operate in more than one hundred countries globally with a wide scope of businesses – and still, their methodology in the background might be entirely different, while the basics are the same: to record quantitative results by bookkeepers, and make decisions for allocation of the resources by financial managers.

2. Theoretical background:

The analysed practical problem in this paper is about large multinational companies handling complex operations with a focus on the methodologies used for processing the large number of transactions, accounting procedures. It is important to describe the conceptual background involved in the analysis, thus the following pages comprise of the relevant definitions, explanations and the details for the specifically high number of acronyms used in this segment of companies.

2.1 Basics of Accounting:

Most of the subject IT systems enhance the effectiveness of corporate accounting in multinational companies. A deep explanation of accounting related foundations is required to highlight and understand the reasons that made all companies globally realize the need for process-enhancement by integrating expensive and sophisticated IT tools into their operations. As a start, the definition of accounting cited from a University Lecture:

“The systematic recording, reporting, and analysis of quantitative financial transactions of a business in a way that is useful for the decision making. (Lakatos, 2015)”

The subject of the above sentence is “Quantitative financial transactions”. The analysis of millions of transactions within a multinational company is crucial for effective management. A company comprise of several divisions, each division with its own features. Features, related to the current inventory status, depreciation, accounts receivable, accounts payable, type of expenses (workforce, rental fees, material costs) amortization, etc. Each and every transaction changes the current status of a company’s and also a division’s data-set. The “systematic recording, reporting and analysis” of these changes in the total data-sets of divisions is essential for precise decision making for management. Without precise recording of transactions, management would have false numbers for the basis of decisions. It results in ineffective management, which
may lead to wrong decisions that is harmful for the whole company. For example, if one of the divisions operate close to the breakeven point, but with positive results, and management decide to invest into it for further improvement. Without imprecise reporting, it could turn out retrospectively that plenty of significantly highly valued transactions were reported incorrectly as an accounts payable for another division, this way resulting in a false report that showed that the division where the large investments have been implemented in reality operated with large losses and the investment was an inappropriate waste of resources. Additionally, legal cases may also be started due to wrong calculation of taxes towards the local governments.

Accounting can be divided into substantive and technical parts. Substantive accounting focuses on information gathering. Uncategorized data is difficult to handle systematically, so it is important to plan what to gather. Automatization is getting more and more widely spread for information gathering, especially if the information can be broken down into major categories and type of information is easy to handle. Human workforce is involved mostly for unstructured, difficult to handle information gathering processes. The key strive for such unstructured tasks is to find a way to categorize and make it possible to automatize the gathering process as soon as possible. This way, reducing number of expensive working hours.

Technical part of accounting relates to processing and providing information. After gathering information, the outcome could be a large set of tables in huge documents. Processing, analysing these documents more often requires human workforce, to be able to provide information for management.

Two types of accounting are financial and management accounting. Financial accounting refers to the production of financial statements that show the performance made for external shareholders too, such as local governments, customers and shareholders. It is required by law. Management accounting is required for better effectiveness within the companies. It provides information for pre-defined set of accounts that includes budgets, forecasting based on analysis of past performance.

2.2 Digitalization of processes:

The pace of digitalization is exponentially growing in the past few decades. The amount of data to store and process reached such levels that were not possible before:

“The volume of data generated in the last two years alone is equivalent to 90% of all the data ever produced online, according to research by International Data Corporation (IDC).” (Guess Contributor at economist.com, 2018)
From this fact it becomes obvious, that such a drastic change in the amount of data needs a drastic change in the methodologies to effectively record, report and analyse in a way that is useful for decision making. Companies first recognized the opportunities in the usage of computers in the 1960’s. In the Hungarian textbook about the foundations of business informatics, Dr Gyurkó György, the author of chapter 4 collects the type of systems and applications used in a chronological order based on the type of tasks supported and writes down the related historical background and describes the usage of each major category of systems (György, 2008):

It was already possible to cut significant amount of costs by replacing human-performed routine, simple tasks by Electronic Data Processing (EDP), the first type of computer usage within multinational corporations. It was used by large corporations mostly because of price and capacity constraints. Smaller companies did not have the resources to invest into IT technicians, whose task was to design the programs for the subject company’s needs, since there were no pre-designed applications for the widely required basic transactions to be processed by companies. Secondly, the prices of the hardware were also very expensive due to the fact that it was considered as a huge innovation in business processes and computers have just been started to be involved in mass production. Mass production of computers started especially for the reason that corporations invested into the cost-cutting opportunities offered by digitalizing and automatizing.

As a first attempt of business usage of computers, EDP only could perform isolated, narrow field of simple tasks.

The next steps were the TPS and OLTP (Transaction Processing System and Online Transaction Processing System). For using applications for work with transactions, it is important to process changes instantly, especially if more departments cooperate in certain processes. EDP solutions were also used for transaction-handling, but the OLTP replaced it by making it possible through online systems to apply all the changes without delay.

OLTP, TPS and EDP were the first invented ways of computer usage within corporations because of the increasingly high amount of routine basic tasks to be replaced to save resources. Subsequently to OLTP, Management Information Systems (MIS) were also created for management of companies. MIS facilitated the effective overview of the routine processes below the management by visualization and easier access of all data generated. The goal of MIS is not to execute tasks but planning and
The history of Management information systems can be divided into five eras, as described in the textbook of Kenneth C. Laudon and Jane Laudon “Management Information Systems”. The current era is the Cloud computing, in which information moves instantly and on the most mobile way, on portable laptops, cell phones, tablets. The systems in use are now much more complex and supportive and can replace not only repetitive, simple tasks.

2.3 Systems used for Accounting in multinational companies

Enterprise Resource Planning (ERP): “Think about all the core processes needed to run a company: finance, HR, manufacturing, supply chain, services, procurement, and others. At its most basic level, ERP integrates these processes into a single system. But new ERP systems are anything but basic. They provide intelligence, visibility, analytics, and efficiency across every aspect of a business.” (www.sap.com, 2018)

An ERP system connects applications, divisions, retrieves data from several sources and makes a centralized way of work for a whole company. The cooperation of lot of different applications make up one ERP system. As it can be seen on the diagram, one ERP system includes most of the processes of a corporation, collecting relevant information. Only the ERP financial management part includes different applications for accounts receivable, accounts payable, fixed asset accounting etc. and online functions, like billing-invoicing, factoring etc.

ERP operations management part enhances the effectiveness of more functions by automatizing processes, and creating an intersection of more applications. This way, it is a system that can show real time data from customers, inventories, sales orders and generating instantly the related invoices for sales or beneficial for HR by using performance management applications, compensations and benefits, travel fees etc. These parts within a large company would be more difficult to oversee in separate parts,
but by implementing one central destination for all the data intake from more software, it can solve issues that may come from bad information management.

There are a lot of companies working on the production of such programs that are capable to handle even extremely complex processes. Most ERP developer companies have their own basic software, but whenever they provide their services to a customer, it is a must to re-design the system to make it correctly align to the current requirements of the actual customer. Especially, when the customer is a large company with unique characteristics, participating within different businesses and operating in several different countries, regions (different accounting regulations, different taxation methods, ratios etc.). This way, it is one of the most important tasks of ERP developer companies to cooperate with customers for the long period of implementation of the system.

Additionally, the fast pace of technical development requires a constant cooperation between ERP vendors and customers, in order to be able to provide all the necessary updates. It includes stability updates, security of the large amount of sensitive, confidential data. New features for further functions to be added, customization for new processes, etc. For customers, it is also a key to consider that it is very expensive to implement an ERP solution within the company. The implementation process also takes plenty of time and effort. This is a strong reason why it is very rare and difficult to change ERP system’s within a large company where high number of functions and processes intersect in one system. It is a large, strategical decision within a company that can affect the overall effectiveness of the company.

In 2016, the ERP applications market total revenues reached $82.2 billion U.S. dollars. The largest participant is the German company, SAP within the business with 7% market share in 2016. 10 companies make up for 28.5% of the total revenue of the ERP market.
market. SAP is being used in more than 120 countries, within more than 32,000 different companies, requiring more than 50 thousand employees.

The market of ERP systems is highly competitive, with high number of companies constantly developing new solutions. The products of businesses (e.g. SAP, Oracle, Microsoft etc.) can be sold in high numbers depending on the maximum output that can be produced over a certain period of time. In case of ERP market, the pie chart includes more companies than it is usual in other markets. The main reason for it is the fact that one ERP provider company has to constantly cooperate with its customers because of the constantly required changes.

The implementation of such changes within large corporations is a long and complex process. The high complexity of the processes requires effective talent retention from ERP vendors. This cooperation requires educated, experienced professionals. The experts of this field have relatively high salaries, and are also a scarcity on the job market. It requires ERP developer companies to contract only a limited number of customer companies, slowly progressing. Within this field it is also exceptionally important to maintain quality services, this is why the estimated compound annual growth rate is a below average 0.6%.

2.4 Accounting Software

“Accounting software is a suite of computer applications and programs that automate financial management in the corporate environment and help managers handle their accounting activities. Accounting software systems are designed for freelance accountants and accounting teams, based on which they vary from simple single-entry apps to enterprise-grade, double-entry solutions.” (Hillsberg, 2018)

Multinational companies all use different types of accounting software. By using dedicated software for accounting purposes, it is possible to reduce accounting expenses with more precise outcome in the form of better financial reports that are used for decision making by the management of the company. For large, multinational corporations it is a very challenging part of their operations. Contrary to small businesses, where simple programs are enough to be purchased, larger corporations need to specialize the programs for their unique circumstances. It is one strong reason why IT expertise is becoming a more useful part of every financial division. Depending on the portfolio of one larger company, and the number of countries with different accounting regulations, the way how the software and which software to use can be completely different.
“Using a general ledger is part of a system used by accountants to create the firm’s financial statements. Transactions are posted to the general ledger accounts, and the accountant generates a trial balance, a report listing all the accounts and each account’s balance. The trial balance is adjusted by posting additional entries, and the adjusted trial balance is used to generate the financial statements.” (No-Author, Investopedia.com, 2018)

The general ledger contains all the transactions of a company. From the large amount of transactions, different parts of the accounting functions of companies process the feded data from the general ledger. Payroll, billing, invoicing, accounts payable, accounts receivable are all separate account functions within larger companies. For dealing with all these functions, different type of applications are also required.

Within large corporations thousands of invoices are being issued. These invoices could point to internal costs between two different entities of one company, or external counterparties. To keep track of the high amount of invoices, accountants use separate applications for accounts receivable and accounts payable. For example, within General Electric company SSS is one of the modules that deals with accounts receivable and accounts payable, but on completely different surfaces for the two different purposes, for which users need to ask for different request accesses as well. This way, accountants are separated into responsibilities related to accounts receivable or accounts payable, and just in some cases, both.

An AP and AR software enhances the effectiveness of tracking the invoices, linking it to customers and trading partners. This way giving a precise overview of the currently outstanding invoices. This overview of outstanding invoices is important for reporting purposes, for example auditing procedures usually include the complete overchecking of both accounts receivable and accounts payable.
Multi level approval system increases the precision of payments. When large amounts are included within the payment of the subject invoices, it is important that the multi level approval system grants more employees to check from more perspectives the actually payable invoices. This way granting a more effective method that makes it less possible to launch transactions incorrectly by manual, human mistake.

It is also important that within an AP and AR software it is possible to link documents and images to the invoices, thus providing official documentation behind every amount. It comes as an essential requirement during the account reconciliation procedures, or while externally and internally auditing the balances, since every single entry and transaction has to be understated by backup documentation and information from at least 2 different sources according to the US GAAP rules.

In case of accounts payable, invoices usually have payment due dates too. Invoices that become backlog, and paid lately after the payment due date often has extra fees, penalties. By keeping in track the accounts payable, it is one more way to cut costs, and be more effective.

Multinational companies often have outstandingly large invoices for a wider set of bought services or goods. To be able to effectively keep track of all the related expenses, billing and invoicing applications are used. These separate applications are required to create official documentations that align to the strict rules of launching larger transactions. The type of invoices may refer to goods or services. There could be plenty of technical restrictions of how to deal with expenses related to goods or services (e.g. different taxation). Thus, it is a quite usual rule that one invoice can not include expenses related to both goods and services due to local regulations.

Larger transactions obviously need higher precision, so precise invoicing is essential with detailed calculations and cost breakdown included in the documentation especially if the invoice covers a wider set of purchased tangible or intangible assets. However, in a large financial system of a multinational company, the high number of invoices could also result in complex issues. By the automatization of invoicing a high number of invoices could be created with great precision. For example, IT invoices (related to routine software maintenance, purchases, server maintenance etc.) are often generated automatically through an invoicing system or while employees are on a project of a field work and billing has to be done based on working hours. This way, even thousands of invoices could be treated as a bulk of expenses, thus creating a
group of invoices, that can be paid after providing a detailed backup documentation from the precise invoicing system.

A company being multinational means it employes people from all over the world as having a presence in more countries. Every country with different regulations related to the compensation and benefits. Within companies, in which the number of employees can be counted in tens of thousands, or exceeds one hundred thousand, it is essential to employ separate teams for payroll purposes as well.

For a payroll team, one, or even more systems, separated applications are required. Such a payroll software always includes a high number of confidential, personal data related to the compensation and benefits of the employees. While a salary has to be perfectly timed strictly aligning to a monthly deadline, it has to be calculated as well. The competitiveness of the company’s salary compared to the market average is taken into consideration.

There are applications dedicated to the measurement of the workload that is assigned to an accounting team or function too. The measure is FTE (Full Time Employee). There are general tasks listed in such systems, each assigned to employees one by one. It helps to keep track of tasks, and, in case of delay of completing it, remotely managed employees are more easy to keep tracked. FTE can also be the measurement that is being transferred to the payroll application. One employee may have a bit more or less than one full FTE.

Apart from tools used for calculating the compensation of employees within a company, several dedicated growth tools are also implemented. Large multinational companies often strive to motivate employees by stating that meritocracy is important. There are such systems in which managers can keep track of their employees performance.

2.5 Strategy and Accounting

The brief description of the example of systems used for accounting purposes within multinational companies shows how wide and complicated this field is.

Decisions had to be made upon which software to use. Wide range of developers are present on the market nowadays, but in the past, only a few decades ago, there was just a fraction of today’s wide variatey of accounting tools. The large multinational companies had the resources to invest into development of accounting software and implemented their own ideas, created own software for the internally required
accounting functions and processes. It gives the topic actuality, since we are currently able to witness the dramatic change of the first periods within this market.

At the beginning, mostly internally developed systems have been created by professionals who may not have been originally experienced experts of the field that required the implementation of the new idea of software usage for covering the new processes. Especially, that it was a new field of business and source of issue-resolution, the quality of such internally developed programs were typically lacking most of the modern application’s smooth usability. Additionally, in this beginning stage the firstly designed programs were much more simple with limited number of variability, not covering the newly upcoming needs of the changing industries.

The range of opportunities have also been changed by the fast pace of technical development. By the usage of the world wide web, all systems require cloud based platforms, connected to each other. This way, becoming accessible remotely, on a mobile basis the processes became much more easy to handle within a multinational environment, facilitating remote management. It required an expensive investment into the change of not only software, but the hardware also.

High number of educated, skilled and experienced employees are required to run the processes smoothly. Typically, the salaries of such employees tend to be higher than the average. It means, that even for a multinational company it is a considerably large cost. This large amount requires deep analysis of the opportunities by the upper management, resulting in refined decision making related to questions of what software to use, how to develop the software or from where to buy it.

The high cost of the decision related to the software usage makes it a critical topic. Additionally, the cost of installation costs are three to four times higher than a packaged ERP software. The installation of a packaged software for smaller firms is much more simple. However, for large companies the process of installation is usually multiple times higher than the prices of the application’s price itself. The final prices are difficult to collect, and usually just estimations.
Techrepublic made a survey in 2001, in which they asked ERP customers about how much they paid for the software. Most of the customers paid millions of US dollars, peaking above 10 million USD. Since 2001, the market has been constantly growing and changing, prices increased. Despite the fact that the information is 17 years old, it gives a perfect picture of how much an ERP could cost. For large companies where complex processes are given with different geographical locations (that also could affect the price of system setup) the price today could be multiple times 10 million USD.

2.6 Strategic Challenge

A huge strategical challenge for management of multinational companies during the integration of new applications is the organisational restructuring. From the aspect of the management it is important to cut operational costs by BPR (Business Process Re-engineering). The whole process requires deep analysis of the current workflows, to find the weak points. The users of the old systems require expensive and lengthy trainings. Trainings, for which trainers are also required. Old processes should be replaced, workers re-positioned. The strategical management of restructuring departments for a new system’s usage, when there are thousands of employees involved in the execution of the current processes may be the greatest challenge what managers can face. It requires close cooperation over a long term period with the direct experts of the tools and specific workflows, and the initial plans for re-designing may result in completely different final outcomes, regarding the cost, the time and the human effort required.
3. **Methodological background and approach:**

I had the opportunity to personally experience the related difficulties of the complex implementation processes and the technical issues related to the currently in use systems within General Electric. I am part of an accounting team, that uses more than 10 different applications, and we are facing constant changes. There were plenty of systems eliminated over the past two years that I have spent there. New ideas, simplification projects and implementation of new system’s usage is also part of every year within the company.

To be able to analyse the steps of software implementation, and reasons behind, it is important to categorize the difficult parts that are involved in the process of the implementation of new accounting systems.

Akbar Khan, the CEO of Elite Informatics has great experience in implementation of different applications for companies. On his webpage, nickmutt.com, average price breakdown of the total cost of a software setup is shared. It can be seen on the pie chart, that the software’s price itself is taking only an average of 15% from the cost of the full package. Apart from the software, hardware is also a part of the total picture, that has to be bought at the beginning. Until there is no further growth in the scope of the software functions that would require extension of hardware’s capacity (e.g. new servers for the increasing amount of users, overwhelming the previous, lower capacity servers), hardware is a fixed cost, and easily possible to create forecast for the expected spendings.

However, there are other elements of the cost breakdown, that are impossible to estimate precisely, and depends on the clients specific circumstances. Reengineering takes the largest slice from the pie chart with a percentage of 43%. This process is essential for most of the purchased applications, to achieve the desired functionalities of
the software within a specific environment. According to the 2015 ERP report of Panorama consulting, only 7% of ERP user companies use the standard packages of the systems. These companies shape their own processes around the solution. These are typically small businesses operating with much narrower scope and simpler workflows that do not need to cope with large, multinational projects, within multiple divisions. All the rest of the companies must spend in average 43% of the budget allocated for the development for the new system. During this technical process, external experts of the ERP vendor companies visit the customers for the long term projects and cooperate with those employees that are the experts of the current workflows that are under the scope of Business Process Re-engineering (BPR). For the most successful way of implementation it is important to move the employees with the best expertise of the subject workflows into temporary positions, projects, to assure that they can focus on the crucial parts of the implementation flow. These crucial parts may include the overall precise knowledge of the workflow, issues and problematic parts that are the currently drawbacks of the system and the advantages as well. This cooperation for the reengineering requires lot of time and effort from these employees, also to learn the usage of the new system. The cost of reengineering alone is 11% higher in average then the cost of the hardware and software altogether. (velosio.com, Ginley, 2015)

After finishing the Reengineering part of the implementation process, Data Conversion is the subsequent step in the flow. This is the part in which the current data set of the company is being transferred to the new systems. It is usually a complicated process, due to the different formats of data stored and the large size of information. Categorization of data is important to create such data within the system that it would be able to interpret and analyse upon. The decoding of the language of one different, other system to transfer into the new one is usually rich in technical issues. It requires hard involvement of IT personnel to face and solve all coding related problematic parts.

After data conversion into the new system has been successfully finished, the testing phase also needs to be finished. It is important that despite of a ready made software, it needs to be tested for several periods to make it sure that all the undiscovered technical difficulties are not going to cause any delay and errors within the accounting functions.

The technical part is impossible to be one hundred percent flawless in the beginning periods of the usage of the new system. When the preparation is mostly ready for real-life actual usage for executing the target processes for which the system was
implemented for, training is the last part. Training also takes a huge, 15% slice from the pie chart that shows the average costs of ERP projects.

3.1 The example of General Electric

I worked for General Electric in 3 different positions in the past 2 years: Financial Planning and Analysis intern, Accounting intern and the current position of mine, Accounting Operations Associate. During my internships, I have met lot of professionals, who work in the finance, accounting and IT fields within the company. I also have cooperated with a person, who is an external expert coming from EPAM, a software development service provider company, to implement their solutions within the departments for General Electric. I already had to use a high number of systems to complete my everyday tasks. Some examples of these applications are not in use anymore. Another examples of systems are planned to be replaced, and as an employee of the accounting department, I was obligated to participate in the related trainings to suite myself for the future use of the completely new systems.

While I was not able to involve myself deeply into the technical, IT related issue resolution part of the system’s set up flow, I still had a wide range of information sources to analyse the current obstacles, goals and reasons behind the decisions: why do we need new software at General Electric? Especially, in an environment, where there are already more than one hundred applications in use within the accounting operation teams. Two years ago, this number was above 500. The number of 136 currently used applications for account purposes is already the result of a two year long project for simplification of this extremely sophisticated part of General Electric.

The practical example of General Electric is perfect to show how difficult and complex it is to manage change related to the applications for accounting purposes. Currently, there are numerous ongoing projects for BPR. The reason behind the high demand for reengineering the current processes is the fast pace of change. Within other companies, like Vodafone or IBM, there is just a fraction of the number of systems what General Electric uses only for accounting.

To show real life examples of system implementation for accounting purposes, I will present the most important obstacles that are currently giving the reasons for change. I am also using a high number of applications during the daily routine, but I also asked for further information from most suitable colleagues.
While organising interviews with the senior management who are dealing with the strategical background based on the confidential figures of the costs and opportunities was not a possible method for my research. However, the Budapest office of General Electric is one of the largest shared services centre of the world globally. Under this location, there is a huge department for IT and accounting, supporting the different entities of the company globally. This centre is called the Global Operations Centre. I am sitting in the same office where the IT and accounting experts are constantly working on the changes that is the topic of this paper. I organised interviews with subject matter experts to understand, what is being changes. I also could find the reasons behind these changes.

Besides the interviews, I attended lectures for those systems that are currently under change and implementation. The subject matter experts also provided me training materials, documents, from which I could learn about applications that are out of the scope of the teams where I have already worked within.

After investigating and reading through the materials provided, I have selected the most relevant and fitting examples to be explained in the practical example for accounting system implementation within General Electric.

The largest difficulty of this practical analysis is that I am not able to show the figures and cost breakdowns behind the processes that were decided to be started by higher management. Mostly, because these are currently ongoing processes. It means that most of the information is still sensitive. Exact numbers and the precise full list of criteria based on which the real decision was made, neither the decision making itself is not located in Budapest.

However, a large part of the execution after these decisions that were made related to the changes in the system usage is located in Budapest for a huge number of projects. General Electric has only 5 shared service centres globally: Monterrey (Mexico), Pudong (China), Chennai (India), Cincinnati (United States) and Budapest. Under this location there is a wide range of functions and departments providing services an support for global entities, trading partners. These departments include Human Resources, Commercial, Supply Chain, and the two important ones from the aspect this paper, Finance and IT. The Budapest office employs nearly 3000 people.

The importance of this geographical positioning can be explained from the analysis that included all the categorisation for the different steps of the implementation of an ERP within different kind of companies. The categorisation of average costs
shows, that in average, the cost of Reengineering of the systems for the own needs based on the circumstances (43%), Data Conversions from the old to the new systems (15%), Training and change management of employees who will use the new systems for execution of tasks (15%) takes altogether a massive 73% in average from the total costs. What is not located in Budapest from the whole process is the decision making of the software purchase, that accounts for 15 % in average for the total costs, and the hardware, servers etc. that accounts for 12 % in average from the total costs.

Thus, I was directly exposed to all the most important processes personally. The interview questions that I have prepared mostly involved the followings:

- How would you describe the system shortly in a few sentences?
- Why is this system useful for the company?
- Is it essential for the company or is it easy to be replaced?
- What are the main difficulties for changing this software to use a new one (organisational and technical view)?
- What are the future opportunities? Is there demand for new systems?

The people who I conducted interviews with were:

András Slezák: he is an IT manager. His team works on several projects, sitting directly next to the accounting teams. Their team’s daily activities include simplification projects for already existing processes (e.g. by creating large macros that save great amount of time by solving different calculations and table creations by just a few clicks) but also the support in creation of a new too called DataLake, that will be an important part of the practical analysis.

Oszkár Izsold: Lead billing support specialist. He is an expert of a software that was created internally by General Electric for it’s own usage, OneBiller. This application is used for billing special costs for different entities of General Electric. Through the example of OneBiller, I want to show how and why it is important and reasonable to employ internally developed software instead of using the services of external vendors which specialize their businesses especially on the effectiveness of their applications for, in great number of examples, the exact same purposes as General Electric’s OneBiller.

Boklina Kate; Ferenc Róka; SMEs (Subject Matter Experts): SME’s usually have great background of accounting experience. It is important for this role to have knowledge and a broad view of most of the applications in use within the company.
SME’s do most of the resolution for IT related difficulties and they help accountants in case of IT issues.

István Takács: external, employee of EPAM, a software development service provider company. As an external, he worked on the implementation of an IT solution used within the accounting department of General Electric in the Vaci Greens office, Budapest.9

After asking my questions, the answers were usually related to complex topics, thus resulting in a few minute long discussion. This way, it was possible to conduct an interview with just a few questions, because the explanations were long.

For further details, I used PDF documents that were created for training purposes and are uploaded for open use for all employees to collective support centrals. It is mostly for self educational purposes, but also contains very useful graphs, charts and diagrams, numbers and figures that show relevant information for the subject topic. The majority of these PDF documents contain a step to step guide for different processes, but as an introduction, the first few pages always include a brief description of the software as well that is being used.

4. Analysis of the practical problem: General Electric

Within the theoretical background of this paper, it was highlighted that General Electric operates with an outstandingly high number of applications used for the accounting operations department. There are several different reasons behind why the company ended up by operating on such an ineffective, complex way it’s accounting processes.

4.1 Reasons of great complexity: size and fragmentation

Firstly, the company’s size is what causes strategic and technical difficulties. General Electric was the only company that remained a part of the Dow Jones index since the foundation of the index, 1896. In the beginning of the 2000’s, General Electric was one of the largest companies around the world nased on the year end revenue, being present in more than one hundred countries.

However, not every global company operates by such complex workflow patterns. The additional reason behind it’s complexity is the company’s diversity. General Electric is an industrial conglomerate, that is present in more markets, competing with global competitors. The company produces jet engines for the aircraft industry from the division named Aviation, produces light bulbs in large quantities,
providing lightning in every different regions around the world. The company is also producing sophisticated machinery for the healthcare industry: GE is a manufacturer and distributor of diagnostic imaging machinery that are used for medical imaging procedures. Being a division with a revenue of 19 billion USD, Healthcare does provide vastly important solutions for today’s healthcare industry. Regarding the General Electric’s revenues, the largest division is the Oil & Gas division, with a revenue above 22 billion USD at the end of 2017.

Additional complexity comes from the fact that the company is constantly changing. Being present with such a wide scope of the industrial markets with world leading amounts of resources for investments, General Electric often considers acquisitions as the perfect strategical decision to exploit the opportunities for further growth and gain technical advancements of smaller companies. In the table, that lists acquisition examples in the a 3 year long period, we can see that the amount invested into acquisitions is measured in billions of USD.

The creation of Baker Hughes, a GE company, for example costed General Electric a transaction of 7.4 billion US dollars. BHGE was created with a merger of GE Oil & Gas, thus creating one company that is worth 32 billion US dollars based on the 2015 combined revenue. General Electric owns 62.5% of the newly created company, 37.5 % is owned by originally existing Baker Hughes shareholders through the NYSE.

General Electric's largest ever industrial acquisition was Alstom, started in 2014, finished in 2015, November 2. The total acquisition negotiated with Alstom for the 3 divisions named as renewables, grid and nuclear required a transaction of €12.35 billion. By integrating these parts of the french company, General Electric increased the number of employees from 300,000 to 360,000. It means a drastic, 17% change in the workforce of the company.

Amongst divestitures, there are also large movements from the company. General Electric announced the plans related to the divestiture of GE Capital, the financial services division, that is also measurable in billions of USD, large part of the company.
In 2018, General Electric sold a huge part of the Power business, that is located in Hungary. By selling the Hungarian mostly lightbulb manufacturer parts, the old Hungarian company Tungsram Group was formed up again, after 1989. It is a traditional, old Hungarian company that was formed in 1901.

Another Hungarian example of divestitures within Hungary is related to the Capital business, providing financial services. Budapest Bank has been sold by General Electric, and became a separate entity.

Based on the previously described reasons, it is clearly understandable how and why General Electric’s global processes became outsandingly complex. The accounting division in the background, however, has well working solutions for all the requirements, providing accounting in qualilies that fulfill the US G.A.A.P. and other region’s specific accounting rules.

4.2. The high number of applications

While the effective workflows for the sophisticated accounting challenges behind have been all created and well working, a huge number of applications have been implanted for technical usage within the company. The high number of applications were required to solve the actual obstacles, at the point in time, when the applications and systems have been implemented. This way of issue resolution resulted in the usage of too much systems. Unneccesarily used systems need to be replaced because of simplification purposes, resuting in less manual workf, this way cost cutting on the run.

The reasons, why the company still has too much, at plenty of cases, not necessarily essential systems could come from different sources.

4.2.1 Early stages of development:

Chronologically, the number one reason is the early implementation of different systems. For example, General Electric developed IBS (Internal Billing System) and OneBiller. These 2 applications have been developed by General Electric’s own employees, internally, because at that time when the decision had to be made about the future systems to use, there were no developed markets of accounting application vendors. This way, GE created programs for own usage.

By the time, these applications have been constantly maintained, upgraded and furtherly developed. This way, there were plenty of new features added, that were specific for the company’s requirements, due to specific codings that are only used internally etc. Nowadays, specialised companies, that provide more effective tools for
fulfilling the same tasks, that IBS and OneBiller provides, are also in use within the company.

The main reason, why the usage of IBS and OneBiller remains within the accounting operations, is that too much GE specific tools have been integrated within these systems. This way, the change to Oracle’s, SAP’s or other specialised company’s solutions would be an unnecessarily complex and expensive investments, that can be still avoided by using the programs that were developed internally.

This way, there are already duplications. External and internal applications are applied for exactly the same procedures, from an accounting point of view (billings, invoices, generating accounts payable precisely for the related cost centers), but operated by several different applications.

4.2.2. Mergers & Acquisitions:

A few paragraphs above it was described how much General Electric spent on acquiring new parts for the company. These acquisitions mean expanded customer base, extended geographical reach, entered new lines of businesses and parts of a new growth strategy.

However, a merger in which thousands of employees are transferred to a new company, also come with great strategical challenges, regarding the successful post merger integration of the new divisions. Especially, at the case of Alstom in 2014, which resulted in a number of 60,000 new employees and new divisions that are worth more than 10 billions in USD.

In the background of these high numbers related to acquisitions also mean vast challenges for the accounting departments. At the beginning periods, all the additional IT tools are in use that came from the side of the newly bought divisions from the integrated company. It means, that additional applications are started to be in use. The case of duplications is also a usualy phenomenon at such processes. It means, that for one process, there could be one program used for older entities of General Electric, but the newly bought part also uses the same applications, but under another license, that was paid by the former owner of the operations. The missing process here is the data conversion from one application to another.

The ex-Alstom entities within General Electric are still under integration from plenty of aspects. There different formats of accounts in use within Alstom, that has to replaced to make it possible to fully convert all their data, to make it possible to intercommunicate with other systems.
Within General Electric, every entity has LE (Legal Entity) and ME (Management Entity) combinations. One legal entity may include several management entities. For example, GE Hungary KFT is one Legal Entity. Within GE Hungary KFT LE, there are more management entities, that are the businesses of the company, that are operating within the country (e.g. Lightning, Healthcare).

The ME and LE combinations are important for the higher management reporting system. The software used for higher management reporting is MARS. The problem with MARS and the ex-Alstom entities reporting is that the coding for LE and ME combinations were still not implemented successfully, thus resulting in additional manual processes in the lack of automatized data conversion between ex-Alstom entities and higher level reportings.

4.2.3. Savings and different taxation:

Additional reasons for furtherly widening the scope of systems in use is the specific geographic location’s pricing strategy. There are regions, where the German company, SAP offers a discount if being selected, compared to another popular alternative, for example, Oracle, which is from the United States. General Electric has an active presence in Germany. For the newly acquired or established German entities of General Electric the accounting procedures had to be solved on the most cost-efficient way. After negotiating with SAP, there was an agreement for a discount between the two companies for the new entities (as told by Ferenc Roka during the interview, who worked on the German part of General Electric for 2 years).

The final reason that I could collect to explain the abundance of applications, is in the different taxation systems. GE headquarters in the USA. In the United States the taxation system’s regulation is not strict, compared to other countries. To prove the actual balances, for example in the Hungarian system, the company must be able to present every single invoice on an instant. The creation of a database, where such a
large amount of documents are quickly accessible, linked to the amounts is very complex. Entities within the company find different ways of solution for this problem. While in the United States there is no need for such a system that stores all invoice on such an efficient way. Usually, there are several months of deadlines given in the United States to send the actual invoices to the tax agencies. In Hungary and Russia, for example, the control of taxation is a personal on-site process, and there are different applications in use within the two countries for this purpose.

4.3. The internally developed systems in use:

The fact, that General Electric developed applications internally was already written before. The 2 internally developed systems that I want to focus on as examples are OneBiller and IBS. Both have been started to be developed in the nineties. In that age, there were no effective competitors within the market of accounting system vendors. This way, the only alternative was to create own systems. By using these systems for over two decades, during the several upgrading cycles, new functions were added. These new functions include a huge amount of GE specific, complex parts (e.g. billing across divisions based on different codings), that cannot be found in the package of any external company’s systems.

4.3.1. Internal Billing System (IBS)

The Internal Billing System is used for the creation of bills for tracking every intercompany transaction. There are specific Business Unit Codes (BUC) in use for recognising the different parts of the company that have transactions in-between each other. The system was required for the precise processing for the high amount of transactions. The table below shows the 5 year metric trends for the transactions that have been processed within the different entities of the company. In 2015, 3482 different entities were included in IBS. The USD equivalent in billions was just below 100 billion in USD. The number of transactions processed in 2014 was 4 million, in 127

<table>
<thead>
<tr>
<th>Internal PDF, GE</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE entities billing each other</td>
<td>2,940</td>
<td>3,110</td>
<td>3,393</td>
<td>3,481</td>
<td>3,482</td>
</tr>
<tr>
<td>USD equivalent (Billions)</td>
<td>74.6</td>
<td>79.1</td>
<td>84.4</td>
<td>93.0</td>
<td></td>
</tr>
<tr>
<td>Transactions processed (Million)</td>
<td>3.5</td>
<td>3.9</td>
<td>4.1</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>FX Trades executed (thousands)</td>
<td>52.5</td>
<td>54.5</td>
<td>66.4</td>
<td>65.2</td>
<td>74.0</td>
</tr>
<tr>
<td>Payment Letters (thousands)</td>
<td>88</td>
<td>104</td>
<td>109</td>
<td>115</td>
<td>120</td>
</tr>
<tr>
<td>Currencies</td>
<td>66</td>
<td>80</td>
<td>82</td>
<td>81</td>
<td>84</td>
</tr>
<tr>
<td>Countries</td>
<td>113</td>
<td>125</td>
<td>125</td>
<td>126</td>
<td>127</td>
</tr>
<tr>
<td>Restricted Currency Countries</td>
<td>57 (50%)</td>
<td>64 (51%)</td>
<td>64 (51%)</td>
<td>66 (52%)</td>
<td>70 (55%)</td>
</tr>
</tbody>
</table>
different countries, including 84 different currencies.

The two main types of transactions are inventory sales and expense charges. Inventory sales are generated at the case of internal exchange of goods. For example, if an entity in the Netherlands orders goods (parts for maintenance, turbines, etc.) from an other entity in an other, or even the same country but different Business Unit code, than the transaction can be instantly and precisely reflected in the Internal Billing System to show the movement of goods in the balances.

The expenses that generate transactions to be processed in IBS are for services and allocations. Services could be engineers employed by one part of General Electric travelling for work to an other entity of General Electric. These charges could be for engineering costs, legal costs, management costs etc. These entries are more often entered manually into the system, in lump sums for certain periods.

Automated data entries can also be set up. It may come from certain systems of the businesses taking part in the transactions. GE corporate is a centralized part of the company, that provides services for all businesses across the company. From GE corporate, invoices are issued automatically for Information Technology costs to IBS for the entities.

IBS provides accounting information to book transactions as accrual or paid. While billing any invoice by using the Internal Billing System, accounting information is always given in a form of ADN’s (Account Distribution Number). There are two different forms of ADN’s. The old version that was used until 2014, comprised only of 16-24 characters, providing insufficient information from the point of view of other systems used within the company. Since 2014, for most of the Business Unit Codes, the new form of 75 character ADN’s have been introduced. The new form includes enterprise standard account information, cost centers, project codes, geographical information, trading partner codes etc.

The downside of IBS is that this system only provides accounting information. Accountants within the company can rely on the reports downloaded from the system, but all the accounting has to be done manually. The manual booking is implemented in several different systems.

Through the system of IBS, settlement procedures of invoices can also be done on a simplified way. The Internal Billing System is directly linked to Corporate treasury, that launches transactions for the invoices for which the payment has been
prepared. There is another application in the background for the purpose of linking Corporate treasury to IBS. This application is called Webcash.

4.3.2. OneBiller

OneBiller is a more complex tool for issuing invoices across the organization. OneBiller issues invoices against the entities of the company for the services of Corporate. Within OneBiller only services are being billed, goods are out of the scope from the billing procedures. The billing is implemented periodically, to issue all the previously set-up cost automatically for the actual periods.

Within General Electric, there are multiple ways to issue invoices. For example IBS, CCL AR, SSS, OneBiller, SAP etc. The problem with most of the systems is the lack of complete customization for the specific needs of GE. OneBiller was developed in the nineties, and there is still a group of 50 people constantly upgrading the system, by fixing the existing technical issues and to add the required additional functionalities.

Through the system of OneBiller, the issuance of the following costs are solved effectively: employee costs, corporate tax, global tax, commercial billing, VAT billing, freight costs, items allocation, other assets.

Most of the above listed costs are also possible to be billed within IBS, but there is no tax engine implemented with IBS, so the system is not able to handle the tax costs. This way, two different invoices has to be created within IBS, if an invoice is to be billed that also involves tax in the total amounts. It results in unnecessarily high amount of manual work, thus OneBiller is used for the issuance of such invoices.

Overall, OneBiller is a more sophisticated, fully customizable billing tool used for the specific requirements of General Electric. While external solutions are also available and are in use within the company, those systems are not able to provide the all inclusive wide scope of billing. This way, General Electric solved the billings for the special needs through systems that have been perfected internally through the past 2 decades.

4.4. Unharmonized processes due to large amount and complexity:

By employing more than one hundred systems, it is clear that a huge number of accounting processes are performed through several different methods. The projects have been started from the very beginnings to simplify the processes, and there are great progression related to the reduction of abundance of accounting systems. According to the company’s bibliography, an ERP is a system that can handle all the general
accounting procedures. An enterprise resource planning system comprises of accounts payable, accounts receivable, general ledger and different purchasing systems.

While having a diverse scope of businesses in more than a hundred countries, the company started using by actual necessities more ERP systems for the accounting operations. The table below, that is from a PDF training document for new joiners of General Electric, shows a few examples of ERP systems that include all the modules of A/P, A/R, GL etc. Information feeds to the ERP systems from different sources (for example, OneBiller & IBS) from corporate applications. The main problem with the high number of systems is not on monotoneus part of entry generating.

The main problem related to the high number of applications for generating entries is the issue resolution. If there is a mismatch between two counterparties that are using two different ERP systems, it is not possible to instantly check the differences, or the source of the problems. There are plenty of manual steps included in the workflow. Additionally, the above table shows just a few examples for ERP systems in use within the company, there are great number of additional ones (Power Max, Navision etc.).

Additional problematic part is that despite using an ERP from the same vendor, for example ORACLE, there are still communication issues between the systems. There are great number of different versions of Oracle, SAP etc. On the table above, Oracle is shown 3 times. The reason for it is that those are 3 different versions.

During an account reconciliation, it is usual process to understate the balances from different sources. Let’s suppose, that there are two trading partners reconciled during one certain period. Both of the trading partners use two different versions of Oracle for it’s accounting operations. Both provide their actual balances for confirmation of account reconciliation purposes. The confirmation has to be asked manually from the responsible accountants. One accountant has the rights to download information only for the part for which the accountant is responsible for. This way, the balance confirmation is a longer process.
Additionally, if there is a mismatch between the balances, issue resolution has a few additional steps, compared to the case if those were implemented in the same ERP systems. To find out which party from the reconcilers have the issue with the balances, the 3rd party application’s or employees backup is required that can provide backup information for explaining the total balances.

This way, we already have 2 different ERP systems balances to be compared with backup details from different applications. It is a process with a great number of unnecessary additional steps.

There were different projects for the simplification for such and similar processes and workflows. In the past 2 years, the IT professionals started a project closely cooperating with the accounting experts of the company. It is an internally started process being prepared by intern employees. The name of the system to be prepared is DataLake. There were already open trainings for the usage of this system (e.g. first time 2018 September in Budapest). He main goal of DataLake is to communicate with all the ERP systems that are in use within General Electric. It would be one huge, collective interface that could replace a huge amount of workflows that are currently manually done by accountants.

However, there are great technical challenges to fully implement DataLake. Firstly, the large is issue of different account usages. The different entities within the companies use different type of accounts for booking the actual balances. There have been a 2 year long project on replacing the account numbers for every single part of General Electric. The type of accounts to be used are the ESA (Enterprise Standard Accounts) accounts.

The main reason why the different kind of account usage caused difficulties for DataLake is the problem of mapping of the accounts through the divisions. The goal of DataLake is to put next to each other all the similar accounts from different systems to make it much faster and easier to compare to progress with actual issue resolution.

It is already in use for a few processes, for example the new account reconciliation tool used within the company, called ARM (Account Reconciliation Manager). The company mostly used GBS for account reconciliation. This system is still in use. However, the balances to be compared are often coming from several different sources. By using the new system, ARM has successfully linked directly next to each other the different system’s balances. The implementation of the automatization
of a great number of account reconciliations saved a huge amount of employee working hours.

During the discussion with István Takács, the external employee of EPAM, I collected the following, mostly finance related information:

The biggest impact IT (BusinessIntelligence) can make in finance is in a global environment like the one they did for GE. Since most Finance services and products are not standardized globally due to culture/legal system/standards IT could help bring all the knowledge together in a fast way. BI could standardize Financial Planning and Analysis through countries and regions, through different leaders. It offered a custom way of working with the data gotten universally independent on where the financial analyst sits. It was automated (not needing refresh like excel and having all the relevant data in it at the same time). BI can also achieve accurate predictions and prescriptions in finance which is especially useful in the planning and analysis department. The solution delivered saved a huge amount of money, time and human resources for GE and was a good ground for further development and making financial products and services more efficient.

5. Conclusion

In the past few decades the massive technological advancement provided a completely new way of methodology for businesses. Account procedures could have been simplified, however, they became even more complex, but more effective. The complexity of the accounting operations comes from the new field of Information Technology problems that are related. The companies that are extremely exposed to such IT and accounting challenges, are those companies that are actually operating in multiple divisions, within multiple regions.

There are great number of functions within accounting. Accounts payable/receivable, issuance of invoices. The precision related to payments. Payments and transactions also usually include taxation into the total balances. The complexity comes actual when there are different division operating with completely different systems and applications.

To avoid using too much applications parallelly, unnecessarily, General Electric decided to start project for cutting the costs and simplify the processes related to the usage of ERP’s and other accounting systems.
The decisions to be made are affecting the whole company. These are huge strategical challenges, that required the highest management of the company for decision making. The technical challenges made General Electric to hire helpful IT experts from external companies that are specialised in the development and simplification of exactly the same kind of issues.

The below table shows a great example of how much and which systems have been excluded from the accounting operations division of General Electric throughout the past few years:

As it was described before, there are still multiple versions of Oracle in use within company. These multiplications of software usages are also planned to be removed from the workflows of the company in a wide range of Business Process Reengineering.

It is visible on the table, that since 2009, the company could finally solve the removal of plenty of version of Oracle within different regions. The plan in 2014 was to achieve only one version of Oracle, Oracle – CCL (Central Corporate Ledger). However, it perfectly shows that even by employing experienced experts for the projects, the technical complex issues prevented the successfully implementation by 2017. Price estimations of this expensive part of issue resolution for account operations simplification and the related system’s development showed that even by the higher senior management’s aspect, it is a crucial part of the company, strategically.

The methodology part of this paper explained and proved the complexity of this topic. The abundance of the systems in use within General Electric was the main topic of the practical analysis.

It was explained through the perfect example of General Electric, a globally operating company, how the company ended up by using such a high number of systems and applications for it’s accounting operations.
Size and fragmentation is one important factor that caused this situation. Additionally, the company is constantly changing. By providing examples of multibillion USD acquisitions, of acquiring of more than 60,000 employees etc. it was shown how the company ended up with such challenges.

The large size if the company and the presence in multiple markets within the industrial sector also causes that the company has specific, unique requirements for the accounting operations. To fulfill these unique requirements, General Electric started to use internally developed systems. These systems are still perfectly, efficiently operating in the day to day operations. The two examples of such internally developed system presented in the practical part were: OneBiller and IBS.

After presenting the past reasons of why General Electric is a great example by it’s great complexity, and showing a few solutions that have been effectively working, the last part of the practical part shown a project related to DataLake. DataLake is a system that links the several ERP’s in use altogether, thus facilitating issue resolution.

There are still great opportunities in the future of DataLake, since the related technical issues are still under investigation and will be solved in the next few years. After implementing DataLake, the work in the system of multiple ERP’s will be much easier, and effective.
References:


**Citations:**


Bibliography


Appendices

List of questions posed at the interviews:

What was the goal when the decision of creating a new system was made?

What are the current challenges of these systems?

What are the future opportunities? Is there demand for new systems?

Who use this system?

Is it essential for the company or is it easy to replace?

What external examples do you know of that compete with intercompany systems?

What external systems have been implemented, but reshaped to stay align to the company’s standards/convenience?
What are the related difficulties and costs for changing to a new system (organizational, management and technical parts)?

How the tasks of IBS and OneBiller were solved before these systems were have been implemented?

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