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POSTGRADUATE STUDIES - SECOND CYCLE

THESIS:

IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS ON THE CLOUD: POSSIBILITIES AND SOLUTIONS

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ABSTRACT

Recently, technology has been changing every day, creating various easier methods that help us in every sphere of life. In particular, these technologies help business organizations and their management to perform and manage tasks faster and more efficiently. As a result of this development, various business organizations work towards the completion of the digital transformation of all their operational and administrative processes, in order to be in step with the latest technological trends, as well as to be one step ahead of the competition.

The main focus of this study is to analyze the implementation of cloud-based Enterprise Resource Planning (ERP) software and to develop Add-On software based on the requirements of the management of case study business organization. This study is based on the results obtained from the implementation of SAP Business One Cloud at JYSK, the development of Add-On software and the conducted questionnaire with 85 of their employees to measure the user experience of the installed cloud ERP software.

The results show that the implementation process has been done successfully and the development of Add-On software has been developed based on the management request. It has been found that employees in retail accept the new technological solutions, and they do not create resistance if they are well informed and trained.

The main conclusion of this study has to do with the fact that during the change or selection of the ERP system, it is more important to select the ERP solution that suits the business activity and during the implementation phase to engage the whole team.

Therefore, it is recommended for the management of the business organization during the implementation of ERP software to organize various trainings for the employees as well as to inform them for every step of the implementation process.

Key words

Enterprise Resource Planning (ERP), Cloud computing, SAP Business One Cloud, Add-on software, Retail, ERP Implementation

DECLARATION

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1. INTRODUCTION

We are living in the age of innovations and technologies. Technology has advanced very much and is present in every sphere of life. Nowadays, people spend more and more time in front of their computer or mobile phone. The same situation is in the business sector, where technology has automated many processes of production, sales, supply chain, accounting, finance, marketing etc. Most of the business organizations are using various forms of Enterprise Resource Planning (ERP) software solutions in order to manage their daily business processes and operations as well as to support the management and employees to complete their tasks easily.

In recent years cloud computing and cloud ERP systems have become very popular among business organizations. Cloud ERP is a usual web-based ERP software solution, which is located in the cloud and can be accessed from users any time through web browsers. Guo and Ma (2018) point out that the changes and growth of cloud computing use has fundamentally changed the way of delivering, using, and managing software, where Cloud ERP now represents a new software delivery and pricing model, in which the vendor hosts, maintains, and manages the application from a central location.

As a result of digital transformation of business organizations, the ERP market is growing rapidly. The German software company SAP AG is one of the first and largest providers of Enterprise Resource Planning (ERP) solutions. SAP Business One Cloud is one of the best cloud-based ERP software dedicated to small and medium business organizations. The advantage of this software lies in the fact that it offers integrated development environment (IDE) for partners to develop extension on top of SAP Business One Cloud.

1.1 Research Background

The primary subject matter of this study is to implement cloud-based Enterprise Resource Planning (ERP) software inside retail business organizations. Specifically, this research will analyze the implementation of SAP Business One Cloud ERP software at the Danish retail chain JYSK through programming and developing Add-on Software Projects

in SAP Business One Studio, in order to manage and satisfy all users' requirements, based on the procedures and process of their daily work. The development of Add-on software for SAP Business One Cloud will be done by SAP Business One Studio, which is an open platform based on .NET framework.

As an especially important part of this research will be the analysis of user experience regarding the implementation of cloud-based ERP software. According to Findik et al. (2012), the implementation of ERP software cannot be successfully implemented due to some external factors such as: the space between system capabilities and business needs, absence consultants and employees' experience, and management mistakes during the implementation project. It is also important for the management to pay attention to data security if they decide to move from traditional to cloud based services.

1.2 Company Profile

JYSK is a Scandinavian retail chain and a quality leader in all products for the bedroom, the bathroom, the living room, the garden, the window and many more products for the home. JYSK started working on 2 April 1979 in Aarhus, Denmark where the founder and today's owner Lars Larsen opened his first store. Lars Larsen was also



the owner of the furniture retail chains Bolia.com, IDEmøbler, ILVA, Eovendo and other companies. Today, the company has more than 2,884 stores across 52 countries where they operate, with a yearly turnover of 2.8 billion Euros. JYSK has more than 500 suppliers from all over

the world and 8 distribution centers with more than 761,400 pallet spaces. Globally JYSK is known as JYSK Group and is organized into three subsidiaries: JYSK Nordic, Dänisches Bettenlager and JYSK Franchise. The JYSK Franchise for Kosovo, Albania and Macedonia since 2004 has been managed by the company Scandinavian Living. The first JYSK store by this company was opened on 10 April 2004 in Prishtina, Kosovo. Today, there are 17

JYSK stores managed by Scandinavian Living with a total of 400 employees across the countries of operation. The mission of the company is to offer customers high-quality products at a great price and growing sustainably at the same time.

1.3 Objective of the Research

There are many studies on ERP software implementation and transformation from traditional ERP systems to cloud-based ERP systems. The purpose of this research was to analyze the development and the implementation of Enterprise Resource Planning (ERP) on the cloud, as well as to analyze the possibilities and solutions that are available nowadays on the market. In addition to the main objective we have set in this study, there is another concern, which is to analyze the following objectives:

1. To analyze the technical requirements and implement the SAP Business One Cloud ERP solution at small and medium-sized enterprises (SMEs)
2. To develop Add-on software with SAP Business One Studio based on the procedures and requirements of the case study business organization
3. To analyze the user experience and their opinion regarding the newly-installed SAP Business One Cloud ERP software.

1.4 Hypotheses

Based on the presented research objectives of this study, the following hypotheses will be analyzed:

- H1.** Technical factors affect the implementation of cloud-based ERP software in small and medium-sized enterprises (SMEs).
- H2.** The specific requirements of a business organization during the implementation of SAP Business One Cloud can be solved through the development of Add-on software.
- H3.** The use of SAP Business One Cloud will increase the resource flexibility level in the retail sector.

1.5 Academic and Practical Benefits of the Research

This research will be a good source for various business organizations which want to change the ERP software from traditional to cloud-based, as well as for those business organizations that are planning to install new ERP software based on SAP Business One Cloud solution. Through this research, the developers and managers of various business organizations will find different techniques of programming of Add-on projects with SAP Business One Studio, which is based on the .NET framework.

1.6 Overview of the Research

This research has been organized as follows. Chapter 1 covers the background of this research, the profile of the business organization and an overview of the main problem and research objectives. This section also includes the definition of hypotheses on which this study will be based. Chapter 2 presents the critical academic literature review of various concepts in the research areas of ERP, Cloud ERP and Cloud Computing. The implementation of cloud-based ERP software has been presented in this chapter. The case study of implementation of SAP Business One has been presented in Chapter 3, where the development of add-on projects through SAP Business One Studio and .NET framework has also been explained. The research methodology has been explained in Chapter 4, including details of different methods that have been used to explain the research hypothesis in order to clearly explain the objectives. Chapter 5 presents the survey analysis and the analysis of the results from the implementation of cloud-based ERP software and the retail business organization. The conclusions of this study have been highlighted in Chapter 6 where several recommendations for business organizations, based on the obtained survey results and the case study, have been offered. In this chapter, ethics, expected outcomes and limitations of the study have also been dealt with.

2. LITERATURE REVIEW

2.1 Enterprise Resource Planning (ERP) systems

Doing business today is easier than any time before, and this is because of the advent of technology innovations, information systems and their application on different industries. Every business organization, regardless of its size or the industry it serves, always needs to have good internal administration and control system. Business organizations around the world are trying hard to provide the customers with goods or services faster and in a better way than their competition. To achieve better results, it is important for the business organizations to search permanently for new technology trends, to improve their working procedures in order to be successful in the industry where they operate. Information technology is a technology or set of components such as tools, processes and methodologies involved in the implementation, installation, development and management of information and computer systems, software, databases and networks within different organizations. The key to having this success is to invest in increasing the efficiency of information systems, the efficiency of business processes and to follow the latest trends in technology and software applications. An information system is an integrated set of technical equipment and system users involved in collecting, organizing, analyzing and storing of different data that can be used by the organization. It is known that when business organizations have efficient business processes, they can be more competitive in their industry. Information management is the technological method used to collect, process, store, deliver, and manage data in order to find and develop solutions for problems of different organizations. Some business organizations, in order to manage everyday internal business processes, use nonintegrated information systems, which support separately different parts of working processes. They use various software systems for finances, customer relations management, document management, point of sale, etc. For each of these software systems, they use special hardware in order make the overall system to function well. However, in order for the business organization to be successful and competitive in the

market, it is essential to share data among all departments. Sharing data between different departments of the business organization reduces the probability of errors, time and costs for expensive hardware. That is why it is important that business organizations integrate a special software system known as Enterprise Resource Planning (ERP) systems in order to achieve success and to successfully manage all the departments dealing with external customers or suppliers.

Enterprise Resource Planning (ERP) systems are software programs used by business organizations to integrate and coordinate information in every business section. As pointed out by Shatat (2015), an ERP system is a technology infrastructure that supports business organizations to integrate information from all the departments with external suppliers and customers, certainly, it connects all the internal functions and processes with the external part in order to create a relationship between the customers and suppliers. According to Sumner (2005), Enterprise Resource Planning (ERP) systems are business software tools that allow business organizations to automate business processes, share data and practices across the enterprise, produce and access real-time information. Turban and Volonino (2010) point out that the main objective of ERP systems is to integrate all departments and functional information flows across an enterprise into a single computer system that serves all the needs of the business organization. Sumner (2005) highlights that by integrating all the information flows, ERP systems help organizations manage the supply chain, inventory, customer orders, production planning, receiving, shipping, accounting, human resources and other business functions. In more detail, an ERP system can help a business organization to manage and control everything from purchasing, sales, marketing, supply chain management, finance, management accounting, product planning, and inventory control. According to Monk and Wagner (2013), ERP software supports the effective operation of business processes which is a collection of activities by integrating tasks related to sales, marketing, manufacturing, logistics, accounting, and staffing—throughout a business. Every company uses different methods of connecting their business processes with their customers and suppliers. An integrated piece of ERP

system software also needs a good hardware system, which could not be realized in the past due to the technological factor. Monk and Wagner (2013) also state that the current ERP systems evolved as a result of the advancement of the hardware and software technology, the development of integrated information systems and the reengineering of business organization to change the focus on business processes. The business organizations that have implemented ERP systems have better control of all information flow inside the working processes, where easy can manage the supply chain, inventory, sales, finance, human resource, production and planning activities. Kayo *et al.* (2014) stated that successful implementation of ERP systems can improve the effectiveness of IT investment in one business organization and can help to achieve cost-effectiveness and to gain value from new business processes. In Figure 1 below, we can see the connection of ERP System with different departments of one business organization.



Figure 1. ERP system (Source: <http://www.prlog.org/11982999-erp-solution.jpg>)

Compared to a stand-alone information system, the Enterprise Resource Planning (ERP) system offers many advantages and benefits for business organizations including: coordination and exchange of information between all the departments within the

organization, real time access to all the information from any location, a unique system of information and support for various business processes. Poonia (2010) points out that an ERP system contains a single database with different software modules, which include customer relationship management, financials, manufacturing, data warehouse, supply chain management, project management, human resources, quality control, cost management, manufacturing process, manufacturing projects, billing, time, payroll etc.

2.1.1 The history and evolution of ERP systems

Enterprise Resource Planning (ERP) systems have a long history that started during the beginning of the 1960s. The history of Enterprise Resource Planning (ERP) is connected with the early development of computers, software and applications, which in general were focused on the needs of business organizations from the beginning. The genesis of ERP history is associated with early attempts at calculating machines during the 1940s.

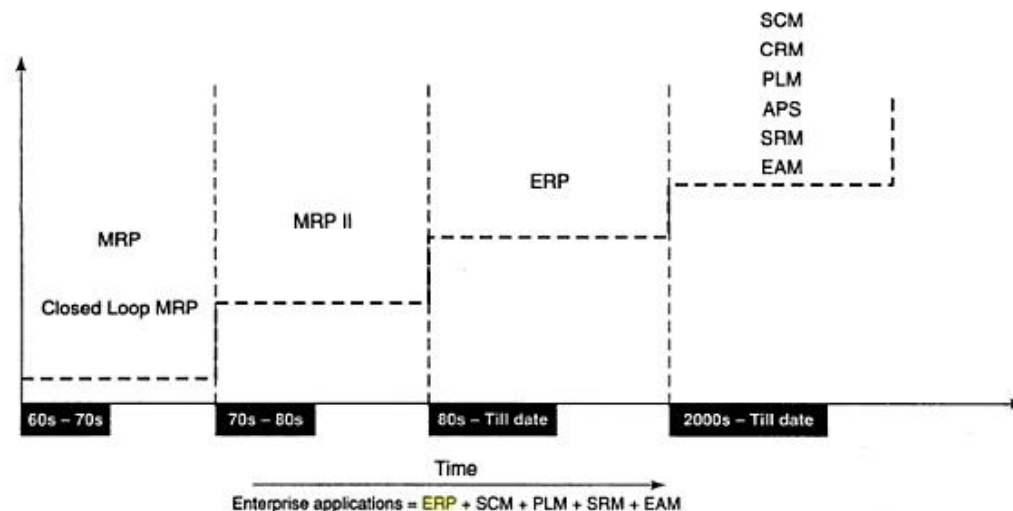


Figure 2. History of ERP and Enterprise Application (Source: Ray 2011: 8)

According to Dowlatshahi (2005), the advances in computerization and networking have allowed the emergence of computer-based ERP systems, as we know them today. Enterprise Resource Planning has its origin from its predecessor, Manufacturing Resource Planning (MRP) II. The first programmed software that did not involve manual

procedures for its use was Material Requirement Planning (MRP). In general, a great deal of the logic and algorithm of ERP software today originates from Material Requirement Planning (MRP) and Manufacturing Resource Planning (MRP) II. Material Requirement Planning (MRP) had its origin from 1960s as the first software used to keep track of all products and needed materials, which covered production scheduling and inventory control. The function of Material Requirement Planning (MRP) was limited and it was only focused on scheduling, purchasing and manufacturing works in general. Material Requirement Planning (MRP), during that time, was the best solution for production and material planning. However, there were many limitations that this system faced, such as the failure to check the available capacity of stock, the failure to connect with other departments of the business organization like sales, marketing, customer relations or quality management, etc. Another shortage was the price of this system where only large business organization had the financial capacity to implement it, because to implement such a solution, a lot of hardware was needed to install and a large technical staff to support and maintain it regularly was required.

During the 1970s, a better solution compared to Material Requirement Planning (MRP) was developed - Manufacturing Resource Planning (MRP) II, which was an extended version of Material Requirement Planning (MRP) with some new further modules and features. These systems at that time were used mostly in manufacturing companies and, as defined by APICS, they were a method for planning of all resources within the company. MRP II included new modules like finance, distribution management, project management, human resources, etc., which at that time were important to control the process of production and distribution. According to Jacobs and Weston (2007), the move beyond MRP that occurred during 1970-1980s was driven by a need for stronger integration between the functional enterprise silos that dominated most of the business organizations throughout this period where software engineers recognized the promise of data integration very early before the organizational structures that occurred in the 1990s. As pointed out by Worster *et al.* (2011), the origin of integrated business systems, known today as ERP dated from the early 1970s where a group of IBM software

engineers proposed to integrate all functions of MRP into a single application through implicating each business action automatically. Since then Enterprise Resource Planning (ERP), systems evolved that offered a complete solution for financial accounting, purchasing, sales, human resource, customer relationship management, product planning, and inventory control. Li and Yue Chuan (2006) highlight that the use and evolution of MRP II/ERP can be generally divided into three stages: the introduction stage, the growth stage, and the maturity stage.

The top sales period for Enterprise Resource Planning (ERP) systems was during the Y2K problem in year 1999, because many business organizations had replaced their old systems with the new ERP system. Therefore, there was a rapid growth in sales and ERP Implementation. Like every industry, the evolution of ERP is in the phase where more of the functions and procedures are based on internet technologies. Therefore, the future applications and methods are oriented towards online technologies where most of the ERP services today are cloud based, which is a very good technology of connecting all devices to the current ERP system. Ptak (2004) highlights that together with the growth of the power and sophistication of computers as well as the rapid growth of internet use, almost all of the existing ERP companies should consider putting a web-based version onto their software solution in order to remain competitive on the market where they are operating. Therefore, understanding the history and evolution of ERP is essential to understanding its current and future application. According to Máté and Kárpáti (2015), the use and implementation of EPRs leads to better productivity and economic performance and they are essential elements of well-functioning economies and businesses.

2.1.2 Characteristics of ERP systems

Since their inception as a complete solution for business organizations, the importance of Enterprise Resource Planning (ERP) has grown fast in the field of their implementation by different business organizations. One of the most important characteristics of ERP systems is that they are centralized which means that they are

based on a central database and their duty is to share data through all the departments of the business organization. Some of the characteristics that make the Enterprise Resource Planning (ERP) Systems to be different are: flexible change depending on the country law and need of business organization, computer based information, which can easily be analyzed and accessed online and offline, integrated architecture, which can be modified and converted on other platforms, coordination between all departments of the business organization, module-based system, where modules can be modified according to the need of the organization, standardized business processes, where all the information is generated in an automatic way, controlled data insertion and easy access from different places, etc. Legman (2015) highlights that the main idea of the ERP software is that information circulates quickly and precisely in the network or in the online environment, by offering working flexibility and reducing working time in order to optimize all the processes in all company departments.

Depending on the use and the modules of ERP systems, they can be divided in Core ERP and Extended ERP. Core ERP includes modules for finance, accounting, manufacturing management, production management, transportation, human resources management, e-business, and operations. On the other side, Extended ERP includes modules for customer relationship, supply chain management, and product life cycle management.

From information management systems, we know that processes are a series of actions or functions directed in order to achieve a specific result. ERP Systems are considered as a process centered solution, which enables a clear, precise and simple picture of the structure and organization of all the business process inside the organization. According to Bradford (2015), a business process is a set of all the activities that together add value to the process, therefore two of the main business processes that most business organizations are facing with are “performing order management” and “procuring materials and services”. According to Wallace and Michael (2001), ERP and its predecessor, MRP II, have been successfully implemented in business organizations with the following characteristics: make-to-stock, make-to-order, design-to-order, complex product, simple product, multiple plants, single plant, contract manufacturers,

manufacturers with distribution networks, sell direct to end users, sell through distributors, businesses heavily regulated by the government, conventional manufacturing (fabrication and assembly), process manufacturing, repetitive manufacturing, job shop, flow shop, fabrication only, assembly only, high-speed manufacturing, low-speed manufacturing. Bradford (2015), in his book about implementation of business systems, highlighted that the key business processes that the ERP System supports have integrated data, which have been presented in Figure 3.

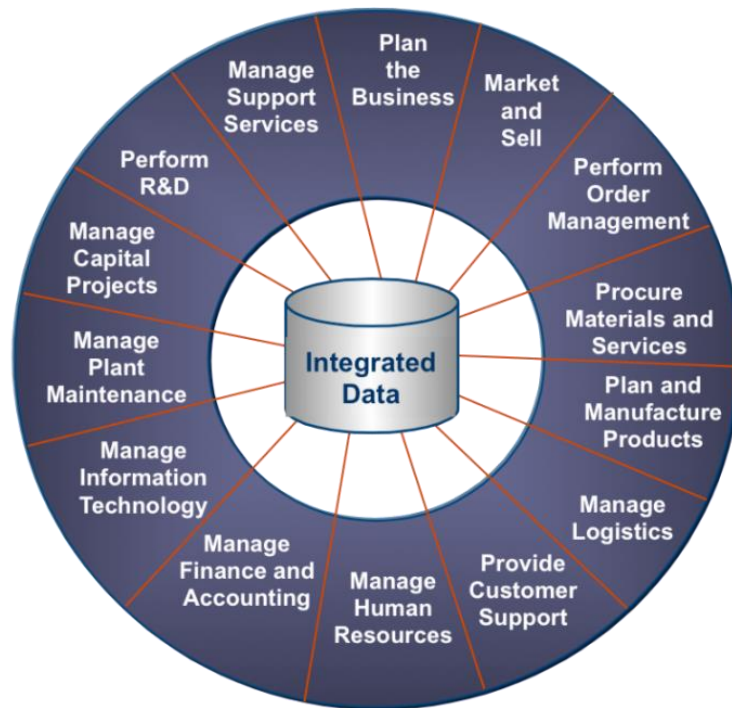


Figure 3. ERP-Supported Business Processes. (Source: Deloitte)

On the other hand, in a study written by Soni (2013), it is explained that some organizations with sufficient in-house IT skills chose to integrate multiple software products and implement only portions of an ERP system and develop an external interface to other ERP or stand-alone systems for their other application needs, which is common to retailers, where even a mid-sized retailer will have a discrete Point-of-Sale (POS) product and financials application.

2.1.3 ERP function and advantages

As in any business solutions, there are also advantages and disadvantages of using and implementing the Enterprise Resource Planning (ERP) software. Enterprise Resource Planning (ERP) provides many advantages, which have been presented below.

Data Integration is one of the main advantages, which is not present on other systems that were used before. In Enterprise Resource Planning (ERP) systems data are stored in a central database which is implemented on the backend and can be accessed or shared anytime across the departments of business organization from authorized users.

The authorized users can have complete visibility into all processes across various departments. According to Tomić and Jovanović (2016), the key elements of the data integration processes are cost optimization and reconciliation of both transactions and data flow. The management of the company, through integrated data, will have access to plenty of information about sales, customers, inventory, etc. which could easily change into a valuable analysis for purchase of goods, reservations and expansion plans of the company.

Real time access is another advantage where the data can be accessed in real time, which means that once the data is stored in the system, it is available online and can be used by all authorized users from different departments and places. In the meantime, all the security policies and regulations of the system are centralized and controlled from the authorized users. According to Cook (2006), the essential element of successful problem solving is the ability to manage information relevant to finding a solution to the problem. Through real time access, the management and employees of different retail organizations will have easier access to current stock at the other store and will be able to respond to costumers by telling them that the requested product is available in one of the company stores.

Unification of all modules is another advantage of ERP system where users have a single interface, similar design and navigation, which makes the system user-friendly. Users

have a single reporting system for analyzing the status in real time. Implementing this kind of system, where the business organization can gain in quality of services as well as reduce many operational costs such as the production or purchasing cost, is **good investment**. Even though there are various modules like Finance, Sales, Human Resource Management, Manufacturing, Marketing etc. in Enterprise Resource Planning (ERP) systems, it is possible to implement just the modules that are necessary.

Radhakrishnan and Balasubramania (2010) point out that some of the major features of ERP and what ERP can do for business organizations include: multi-platform, multi-facility, multi-mode manufacturing, multi-currency, multi-lingual facilities, supporting of strategic and business planning activities, operational planning and execution activities, covering of all functional areas like manufacturing or selling, increasing of customer service, bridging of the information gap across organizations, providing of complete integration of systems not only across departments but also across companies under the same management, automatic introduction of the latest technologies, such as Electronic Funds Transfer (EFT), Electronic Data Interchange (EDI), Internet, Intranet, Video conferencing, E-Commerce etc., as well as eliminating the majority of business problems such as material shortages, productivity enhancements, customer service, cash management, inventory problems, quality problems, prompt delivery, etc.

Ecommerce nowadays is a technology, which is mandatory for any retail company because people do not have too much time for shopping and always look for ways to simplify things. With good integrated ERP software, the Ecommerce web page or application can be easily managed.

Another key advantage is that ERP Software offers better control over inventory, which is one of the biggest problems of most retail companies. Inventory control can be managed better with integrated ERP software and adequate hardware and technology.

2.1.4 Disadvantages of ERP systems

There are some disadvantages of Enterprise Resource Planning (ERP) systems and every disadvantage depends on the type of business organization and their internal processes. Below we have stated some of the main disadvantages that most of the businesses are facing with:

The Implementation of Enterprise Resource Planning (ERP) systems is not an easy process. It is a complicated process that takes time to be fully implemented. Some projects may take 3 years or more to be implemented. This is one of the main disadvantages of Enterprise Resource Planning (ERP) systems; not every business organization has the capacity to wait many years to implement this kind of system. It needs time, good organization, an educated team and energy to implement successfully this kind of systems.

The cost for Enterprise Resource Planning (ERP) system implementation is too high, therefore, most of small and medium business organization cannot implement it. Another factor that increases the cost of Enterprise Resource Planning (ERP) implementation is that it requires experts to maintain the system and train the employees. It is important for business organizations not only to have enough money to implement Enterprise Resource Planning (ERP), but also, they must have enough money to train the employees and maintain the system.

Customization difficulties during implementation and afterwards, the Enterprise Resource Planning (ERP) system must change slightly to suit the needs of the business organization. Some business organizations have unique business practices and with the implementation of standard ERP systems can lose that unique practice of doing business. Therefore, for these kind of business organizations it is more important to customize the software rather than change its business processes.

The implementation of ERP system is very complex and it requires constant participation of employees of the business organization. Without the participation of the employees

of the business organization, the Enterprise Resource Planning (ERP) cannot be successfully implemented. The employees must be motivated and continually trained on how to use this system. The success of the system implementation is dependent on how the employees utilize it and how they work together as a team.

2.1.5 ERP Systems and related technologies

Enterprise Resource Planning (ERP) systems in line with the advancement of technology, have undergone major changes in recent times. As every new technology, Enterprise Resource Planning (ERP) works with other technologies. Some of the new technologies that are related to the ERP System and have left a positive impact on this industry have been listed below:

E-Commerce (Electronic Commerce) is the technology for buying and selling goods or services through the internet. Nowadays, Enterprise Resource Planning (ERP) systems are focused on web-based applications and solutions where e-commerce plays an important role. According to Westland and Clark (1999), the definition of e-commerce purposely does not include the inter-organizational systems such as e-mail, telephone, fax, or Internet telephone, as well as internal computing accomplished by accounting, sales, inventory, treasury, personnel, or executive information systems.

M-Commerce (Mobile Commerce) is the technology of buying and selling goods through mobile devices such as mobile phones or PDAs. This technology is based on WAP (Wireless Application Protocol) which is one of the most important technologies for using m-commerce through the web browser of the GSM device. Ashraf et al. (2017) point out that the usage of smart phones has rapidly grown, which is causing mobile commerce to become an important area in industry as well as in academia.

Another technology related with ERP is C-Commerce (Collaborative Commerce), which is the use of technology by different business segments by connecting together suppliers, competitors and customers.

Business Process Reengineering (BPR) is the technology that was used before the invention of the Enterprise Resource Planning (ERP) system where every business organization needs to reengineer their processes. According to Radhakrishnan and Balasubramania (2010), fundamental rethinking and radical redesign of processes are needed to achieve dramatic improvement, in critical, contemporary measures of performance such as cost, quality, service and speed. Business Intelligence represents different software solutions and applications that are used to analyze the data of one business organization or industry.

On-Line Analytical Processing (OLAP) - According to olap.com, the OLAP (Online Analytical Processing) is defined as the technology behind many Business Intelligence (BI) applications which is a powerful technology for data discovery, including capabilities for limitless report viewing, complex analytical calculations, and “what if” scenario (budget, forecast) planning.

Management Information System (MIS) is a collection of financial data organized and programmed in such a way that it generates information and reports on operations for every level of management in one business organization. An Executive Information System (EIS) is a support system for decision making which is used by the top management for decision-making processes. A Decision Support System (DSS) is a computer-based decision support application that stores, organizes and analyzes business data for the management of one business organization. In a study about the business intelligence tools conducted by Fourati-Jamoussi and Niamba, (2016), it was concluded that a BI tool implementation in any organization is accompanied by organizational changes, which are usually cultural changes, with a financial impact. Another technology related to ERP is the Enterprise Information Portal (EIP), which is a framework that is used to integrate information, staff and processes inside a business organization.

Web Services is part of any software solution, which works through the internet, using a web browser with standardized XML for encoding all the communications to web.

According to Chen et al. (2017), web services are defined as software, which offers a set of business functions over the web and can be described, published, discovered and programmed through web network by using open standards.

Knowledge Management is the process of managing, sharing and creating of knowledge assets of one business organization in order to provide values and strategies. Dzenopoljac et al. (2018) in a study about the effect of knowledge management in sales, market share and profit, pointed out that there was a significant positive linear correlation between knowledge management processes and these three performance indicators.

Data Warehousing is the method collection technology. According to Golfarelli and Rizzi (2009), data warehousing are the techniques and tools used to support knowledge workers—senior managers, directors, managers, and analysts—to conduct data analyses that help with performing decision-making processes and improving information resources. Leon (2007) highlighted that the primary concept of data warehousing is that data stored for business analysis is most effectively accessed if it is separated from the data in the operational system.

Data Mining is the process of analyzing of big data sets from different perspectives in order to provide useful information for authorized users. According to Adams (2010), data mining is sometimes concerned with automatically obtained data, which may refer to the whole population, all costumers of a bank or retail.

Supply Chain Management (SCM) is the active management of all the supply chain activities inside one business organization in order to maximize the customer values and achieve positive results. Kanungo, S. (2012) highlighted that supply chain management starts and ends with the customers, aiming at integrating all the departments of a business organization into a single system.

2.2 Cloud Computing

In recent years, Cloud Computing has become one of the most important technologies, which is similar to grid computing and provides access to shared computing power and storages through offering different services such network, server software, etc. Cloud computing provides various services through the internet such us: network, servers, software etc. Compared with traditional computing, cloud technology offers a new better way of functioning, which helps different organizations to complete the tasks in the easiest way.

According to NIST (National Institute of Standards and Testing), Cloud Computing definition has three sections:

Essential characteristics. NIST identifies five characteristics that a Cloud Computing environment must embody to implement 'true' Cloud Computing.

The five characteristics are:

- On-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service.

Service models. NIST defines three ways in which Cloud Computing can be delivered:

- Cloud Software-as-a-Service
- Cloud Platform-as-a-Service
- Cloud Infrastructure-as-a-Service.

Deployment models. NIST describes four different ways in which Cloud Computing environments can be deployed:

- Private Cloud
- Community Cloud

- Public Cloud
- Hybrid Cloud.

In the book by Carstensen et al. (2012), the most important is the deployment model, because it examines how Cloud Computing can be deployed before moving on to the characteristics and delivery models. In general, cloud computing has many components, but just like most technologies, the key components are clients and providers. Clients are the end-users who are using the technology from different hardware such as PC, mobile, tablets. Providers are the agents who are offering and delivering the service to the users. Nowadays there are many cloud service providers in the market, such as SAP, Amazon, Google, Salesforce, IBM, Oracle, Workday, etc. Depending on the method of use, cloud computing can be divided into private cloud and public cloud. According to Cearnău, D.C. (2018), the main advantages of using Cloud Computing over traditional technologies is the quality of the network infrastructure as well as the way where machines can be managed automatically to scale up in order to offer the best performance.

2.2.1 Characteristics of Cloud Computing

According to NIST, the cloud computing technology is based on five characteristics, which are important in order to understand the functioning of Cloud Computing technology. In a study by Mell and Grance (2010), Cloud Computing consists of five essential characteristics, which are broad network access, on-demand self-service, resource pooling, rapid elasticity and measured service.

On-demand self-service. In the book by Carstensen et al. (2012), demand self-service is described as a characteristic where developers and costumers do not refer to the end-user of an application but they refer to someone that is associated with the application that runs in the cloud.

Broad network access. This characteristic is defined by NIST as: Capabilities are available over the network and accessed through standard mechanisms that promote use by

heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations). This means that this characteristic is for services that are used in private cloud and are available to be accessed from different hardware such as mobile phones, tablets or laptops.

Resource pooling. According to NIST, the provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. Carstensen et al. (2012) explains resource pooling as an environment where the resources are shared among all groups, dynamically assigned according to the needs of the moment – and then reassigned later to yet another user.

Rapid elasticity. This characteristic of cloud computing is defined by NIST as capabilities which can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand. This is very important for the end users because they can use the resources when they need and remove them when they do not need, which means less capital expenditure for the organization.

Measured service. In the book by Carstensen et al. (2012), this characteristic of cloud computing has been defined as most controversial because it represents a big difference to how IT companies charge for their services. The fifth characteristics of cloud computing is defined by NIST as: Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

2.2.2 Cloud Computing Architecture

The architecture of cloud is a system that is connected to different cloud components together and is known as cloud system. This kind of architecture is divided into two sections: Front-end and Back-end. Front-end is the platform that can be seen from the

client's side and Back-end is the architecture that is used by the provider of services. Below, in Figure 4, we have presented the architecture of Cloud Computing explained by NIST where the function of Cloud Consumer, Cloud Auditor, Cloud Provider and Cloud Broker have been defined.

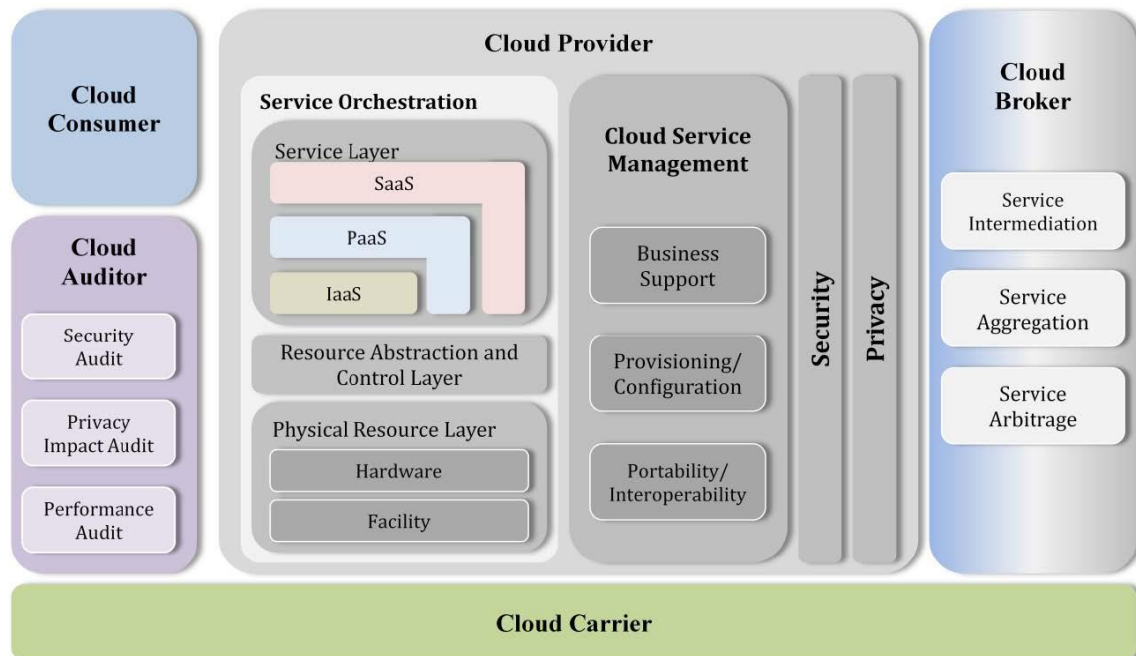


Figure 4. The Conceptual Reference Model (Source: NIST 2011).

Cearnău (2018) pointed out that cloud computing architecture works by “renting” the physical resources that belong to a Client Service Provider (CSP), which shares the same data with clients, and the security of the system is made on multiple levels such as: network level, virtual machine level and application level. Cloud computing is divided in two kinds of models: service models and deployment models.

2.2.3 Cloud Computing Service Models

The cloud computing service model is based on the following types or levels of service providers: Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). Software as a Service (SaaS) is a software that is developed in the cloud and is offered by cloud providers as a service where all software

is installed and hosted by the provider. Platform as a Service (PaaS) is an advanced version of SaaS where the provider gives access to the user to the components and modules that the user needs to develop. Infrastructure as a Service (IaaS) is an agreement between two parties where the provider offers the whole infrastructure, hardware and software to the client. According to Bajenaru (2010), the downside of cloud computing service models is in the uniqueness of the phenomenon that comes with distrust as a principle, the much fewer known vendors, and the trust that the user must put into the provider company about all the vital information that is hosted to the servers of the provider.

2.2.4 Cloud Computing Deployment Models

The cloud computing deployment models are based on the following models: public cloud, private cloud, hybrid cloud and community cloud. Below is the NIST definition for deployment models:

- **Public Cloud** - The public cloud infrastructure is available for public use alternatively for a large industry group and is owned by an organization selling cloud services.
- **Private Cloud** - The private cloud infrastructure is operated for the exclusive use of an organization. The cloud may be managed by that organization or a third party. Private clouds may be either on- or off-premises.
- **Hybrid Cloud** - A hybrid cloud combines multiple clouds (private, community of public) where those clouds retain their unique identities, but are bound together as a unit. A hybrid cloud may offer standardized or proprietary access to data and applications, as well as application portability.
- **Community Cloud** - A community cloud is one where the cloud has been organized to serve a common function or purpose.

Farah, B. N. (2015) pointed out that the public cloud providers allow customers to control resources usually over a web service interface where the customers rent access to

resources and through private cloud the provider gives to the user immediate access to computing resources hosted within an organization's infrastructure. According to Carstensen et al. (2012) it is important to mention that hybrid Cloud is the deployment model which is uncertain in common use, because it is used to describe very different Cloud topologies and use patterns.

2.2.5 Cloud Computing Security

Nowadays one of the most important issues within the business organization is securing the information system. As for other technologies and IT environments, for cloud computing too, security is one of the most significant issues. The security issue of cloud computing is the reason that most of the business do not trust the Cloud ERP solutions. According to Srinivasan (2013), cloud computing from the security point of view should be seen as a potential point of failure because cloud providers have high redundancy in their architecture and they must know to provide physical security as well as they must understand the levels of security they are guaranteeing. In the book by Carstensen et al. (2012), the introduction of new technologies is explained as one of the major sources of business organization where some technologies are more disruptive than others. Cloud Computing has the potential to be very disruptive for business organizations in general, and for information technology departments in particular. From this, we can conclude that one of the main reasons that business organizations do not change from traditional ERP to cloud based ERP is the security issue.

2.3 Cloud ERP systems

As technology trends are changing every day, the same applies to ERP Systems, which have seen significant development recently. One important development in the field of Enterprise Resource Planning (ERP) is the growth of use of cloud computing solutions, which are considered an easy way of functioning for many business organizations. Cloud ERP is web-based ERP software, which is located on the servers of the service providers. According to Walther et al. (2018), cloud-based systems have gained much fame in the contemporary technology landscape because they are offering business organizations the option of adopting software through a subscription-based approach.

Depending on how technology evolves and the way latest technological trends are changing every day, it is obvious that technology services as well as ERP services will move to the cloud due to fact that they can manage both the admin and client side of the software in an easier way. Raihana (2012) points out that cloud ERP, as a revolutionary and innovative software for more business organizations, provides a solution that is flexible, adaptable, scalable, efficient and affordable. Therefore, the software that is running on old platforms will slowly begin to disappear, and will not be a choice for modern business organizations.

2.3.1 Characteristics of Cloud ERP Systems

Nowadays, we are witnesses of moving of different technologies onto the cloud. The same happens with the ERP software systems where different experts of the field believe in the fact that the future of ERP software is on the cloud. Cloud ERP software is offered through Software as a Service type of cloud computing. According to Legman (2015), ERP software can improve business efficiency in general by keeping internal processes integrated, transparent and accessible and it leads to better outputs in several areas. The use of ERP Software in the retail industry has increased because most of the processes in this industry are connected with the technology. Therefore, cloud ERP for most of business organizations has become cost effective and provides better solutions to their

everyday procedures. We can say that cloud ERP software, compared with the traditional software, has an advantage because it has more computer power and hardware support. As mentioned by Mahadevan (2000), the internet business models have divided the market space into three parts: portals, market makers, and product/service providers where product/service providers deal directly with their customers. Cloud ERP services are delivered through Software as a Service for cloud computing. The good side of a cloud-based system is that it can be easily integrated with ecommerce shopping carts and through local banks, the online payment can be implemented. With cloud-based ERP software, the business organization will benefit a lot starting from expenses for hardware, server software licenses, real-time connection with the stock of other stores, e-commerce implementation, mobile application. With cloud-based ERP software an integrated CRM (Customer Relation Management) system can also be implemented, which will help to deal with customers and their requests about products. Cloud based solutions will also affect the whole Supply Chain Management system in which purchases as well as orders from different stores will be conducted in an easy way, through an automated system. With cloud-based solutions it is also possible to connect the system with the database of the supplier and by synchronizing the databases, better exchange of information between departments can be obtained.

2.3.2 Cloud ERP Security and Data Control

The security and data control of cloud ERP is a concern of every business organization. When we talk about Cloud ERP software, the first thing that most of the users are asking is the security of these systems, how secure is the Cloud based ERP system, how the information that is stored on the servers outside their business organization is secured. For most of the business organizations, cloud-based ERP is still a challenging issue due to the fact that they are not sure about their authenticity. The security of the data for a Cloud ERP System is more complex because this kind of systems has different modules of functioning. Therefore, the security of data loss is managed through planned backups. According to Sahin (2013), elementary components of data

security consist of integrity, availability, confidentiality, non- repudiation and traceability, where compared to traditional ERP system, cloud-based systems help users to reduce the security issue because the data are maintained by the provider. In a study about data security issues in cloud-based Software as a service ERP, Saa et al. (2017) point out that through hybrid solutions, business organizations can choose to keep their important applications on-premise as well as on the cloud ERP. This is suggested as an effective solution for large business organizations. On the other side, most of the Cloud ERP providers have advanced the security and control of cloud-based software through asset protection and data integrity, power backup as well as through restricted physical access and network security.

2.3.3 Cloud ERP vs On-premise ERP Systems

For most of the business organizations one of the most important questions when they need to decide about Enterprise Resource Planning software is which kind of platform to choose. Even though there are lot of similarities between cloud based and traditional ERP systems, since they complete exactly the same procedures for the business organization, the cost of the system, security issues, user administration, authentication, trained IT staff, data protection and privacy make the user analyze and think which system is better for their business organization. The decision of choosing the ERP software for a business organization is very important because it affects the successful implementation of ERP inside the organization as well as the future success of business processes. According to Guo and Ma (2018), traditional software vendors have a much longer history than their cloud-based competitors whereupon for many decades, in most software industries traditional ERP software vendors have had an established customer base through which they control most of the market share. This market share between on-premise and cloud ERP will change where the use of cloud ERP will grow due to the fact that in general the use of internet and cloud computing has marked a rapid growth in recent years.

2.3.4 Cloud ERP Vendors

Many software development companies offer Cloud Enterprise Resource Planning software. Depending on the business organization, they provide the software solution. ERP vendors are classified as Tier I, II or III. According to Snellman (2017), there are four vendors in the market, namely big business organizations such as: SAP, Oracle and Microsoft, as well as Infor that belong to Tier 1. Some of the most known software development organizations that offer Cloud ERP solutions are:

SAP AG is world leader in the market of ERP software. Krishnadan (2017) points out that SAP's headquarters is in Walldorf, Germany, with locations in more than 130 countries all over the world. The business organization was founded in Germany in 1972 by five former IBM employees and nowadays the company has more than 78,200 employees. SAP is an acronym for Systems, Applications and Products in data processing. SAP ERP has 12 modules and 72 sub-modules, which include around 20,000 tables to define the data requirements of an organization. SAP cloud ERP can also be connected with systems such as CRM, SCM and business intelligence can be integrated into SAP ERP.

Oracle is an American software company and was founded in 1977 by Larry Ellison, Bob Miner and Ed Oates. Its primary business was to provide relational database management system. In 1988, Oracle decided to enter the ERP market where in the beginning they mainly developed software for accounting, later ERP, SCM and CRM. Väänänen (2013) points out that Oracle offers cloud ERP as expected pricing subscription based on SaaS deployment model, where he concluded that Oracle cloud ERP is more comprehensive, flexible, modern, reliable and secure; it runs faster with less upfront costs and investment risk in turbulent economics compared to the on-premises ERP. In a study by Machal (2013) about Two tier ERP systems, Cloud ERP manufacturing service outsourcing, he points out that for business organizations that use cloud ERP and need

to store data in the cloud, Oracle offers storage as an outsourced service that companies will use as they grow and that the storage may need to be expanded as they grow.

Microsoft Dynamics is a product of Microsoft, which was founded in 1975. Microsoft Dynamics is a combination of enterprise resource planning and customer relationship management. According to Krishnadan (2017), Microsoft Dynamics applications are delivered through a network of reselling partners who provide specialized services, where Microsoft Dynamics provides business solutions for both small & medium businesses and Enterprises, including Dynamics NAV, which is for small organizations that require at most 500 concurrent users. Dynamics AX is for larger organizations and it can support as many as 3500 concurrent users.

NetSuite is an American cloud provider founded in 1998. NetSuite is one of the most known cloud ERP providers, which has offered their services in the cloud from the beginning. According to Snellman (2017), NetSuite are mostly focusing on making the Cloud ERP system easy and flexible for users, which on the other hand, makes the system flexible and enables business organizations to add new subsidiaries in order to use 2-tier architecture.

Infor is a multi-national business organization, which is focused on providing cloud-based software. Infor offers the following ERP software solutions: Infor10 ERP Enterprise, Infor10 ERP Express, Lawson M3 ERP Enterprise, Infor10 ERP Business and Infor10 ERP Process Business. Snellman (2017) points out that Infor uses the Amazon Cloud application to host their solutions and it enables users to split their application in different Amazon Availability zones in order to minimize the risk for the whole application to get down.

2.3.5 Selecting the right Cloud ERP System

Every business organization has different modes of functioning and requests related to using cloud ERP software. Therefore, one of the main rules that business organizations must respect when selecting cloud ERP software is to find a match between their

business processes and the new cloud ERP. Selecting the right ERP software for the business organization is not an easy step; all future operation procedures and functions will depend on the proper use of this software. The reason that small and medium companies select to install Cloud ERP system is not only the cost but also the complication of implementation and maintenance of traditional ERP systems. According to Onut and Efendigil (2010), selecting the right ERP software is one of the most important decision-making issues because if the manager selects the wrong ERP a misfit between the software packages and strategy of the company may happen. There are many mathematical models for selecting the best ERP vendor, such as the fuzzy analytic network process, neural network-based approach and fuzzy linear regression. In a study about integrated models to select an ERP system for small and medium business organizations, Zeng et al (2017) point out that their new approach for selecting SME ERP systems works better and is simpler than other models, where they used the modified Delphi technique to confirm the criteria for ERP system evaluation.

2.3.6 SAP Business One Cloud possibilities and solutions

SAP Business One Cloud is a Cloud ERP solution that is mostly used by small and medium business organizations. The first version of this software was developed by Reuven Agassi and Gadi Shamia, in 1996 in Israel. In 2002, the company was acquired by SAP. In his book about SAP Business One Cloud Implementation, Niefert (2009) points out that SAP Business One provides better information in real time and it helps users to minimize the risk that might happen during daily decisions by entrepreneurs. SAP Business One, as a single software solution, provides services for all departments within a business organization. SAP Business One consist of 15 modules, such us: Administration, CRM, Opportunities, Purchasing, Financials, Sales, Business Partners, Banking, Resources, Production, Project Management, Service, Material Requirements Planning (MRP), and HR. Niefert (2009), defines SAP Business One Cloud as: “Designed exclusively for small businesses, SAP Business One Cloud is a single, affordable business management solution that integrates the entire business across financials, sales,

customers, and operations.” Below we will explain all the modules in order to better understand their functionality.

Administration is one of the modules of SAP Business One through which the user can manage the reporting and analytic tools that support decision making. Through this module, all the settings and authorizations of business organization can be configured. This module is divided in to three categories: authorization, form settings and cross all types. One important benefit of this module is that it manages temporary authorizations.

CRM is another module of SAP Business One which is created in order to understand better the whole company sales process as well as to understand the activities of clients. The CRM module is centralized but the activity can be assigned to different users.

Opportunities is the module where the SAP Business One user can manage the sales opportunities, forecast sales and turnover of the business organization activities.

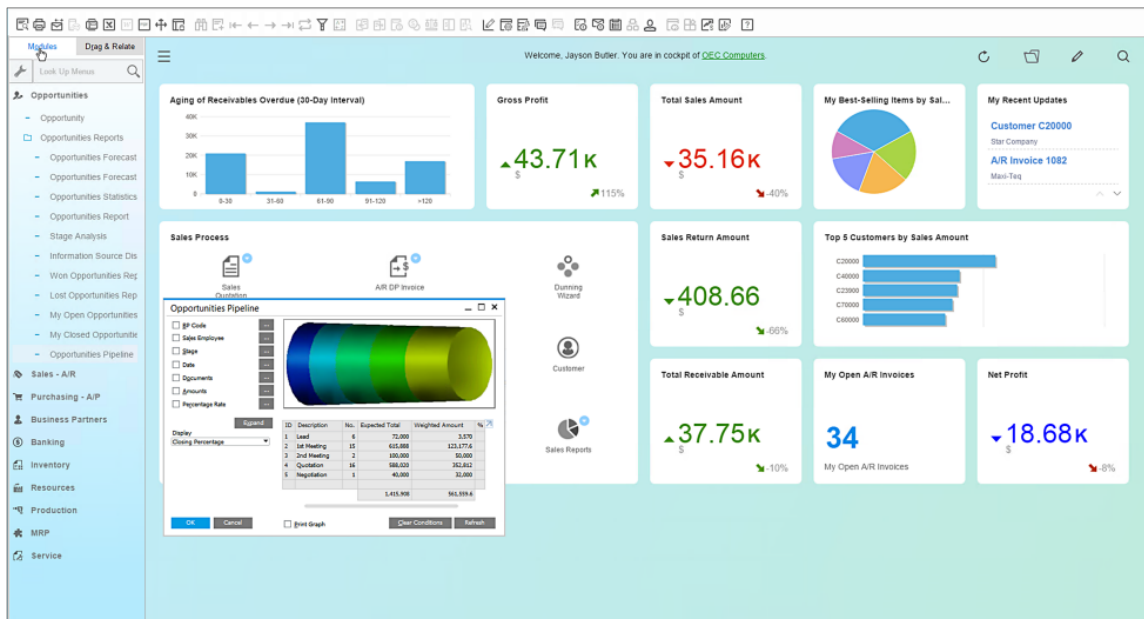


Figure 5. SAP Business One Cloud Modules (Source: sap.com 2020).

Purchasing is the module where documents and functions used as a part of supply chain are defined. Through this module, the user can also analyze the whole purchasing. It is important that through this module, users can make a request for returning the goods

and they can enable efficient management and tracking of the entire return process.

Financials module is responsible for controlling, managing and administering all the financial process that happen inside the business organization, starting from exchange rates differences, cost accounting, financial reports, budgeting. In general, there are many tools included in this module through which all the financing and accounting processes can be managed. Users of this software, through this module, can obtain better support, better control over account balances, and better management of cost, cost relocation, integrated payment and accurate period of closing.

Sales module covers all the sale process that happens inside the business organization, starting from creating invoices to final phase sales and after sales services. Through this module, users can use gross and net prices on the documents and they can implement streamlined gross price calculation method. This module is important for retail through which they can increase productivity and simplify their own activities.

Banking is the module that manages the payments and the monetary transactions. It consists of many options like incoming payments, deposits, outgoing payments, payment orders and banking reports, which are necessary for the functioning of business organization.

Business Partners module manages the data for all business partners, including the information about customers, suppliers, their account statement and future payments.

Resources and Production modules are platforms that are used for manufacturing processes and together they calculate all the materials, labor force and additional costs used for production. Through the production module, users have the opportunity to produce the orders in a single machine as well as the opportunity to divide daily capacity with single run capacity.

Project Management module is the module through which the user can manage the projects, monitor and define deadlines and centralize all project-related transactions.

Service module manages the services and all the contracts of the business organization. Through this module, users have better control of projects and transparency of information related to different project levels and different subprojects.

Material Requirements Planning (MRP) is a module that is related to production where the user can regulate how much goods should be purchased for a manufactured item.

HR module is the option that manages the human resources of the business organization. Through this module, the user can create various reports and employees list in order to manage all the issues that are related to employees of the business organization.

Inventory module provides different features about the inventory, shipments and item location. Through this module, inventory transactions, reports, goods receipts, goods issues, inventory transfers, initial item quantity settings, master data records, and inventory counts can be managed.

2.3.7 SAP Business One Studio and Add-on projects

SAP Business One Studio is software, which offers many options for developers to code and design Add-on projects for their business organizations. According to Niefert (2009), SAP Business One is ideal to integrate all data together for business organizations that use multiple systems, Excel reports and manual data synchronization.

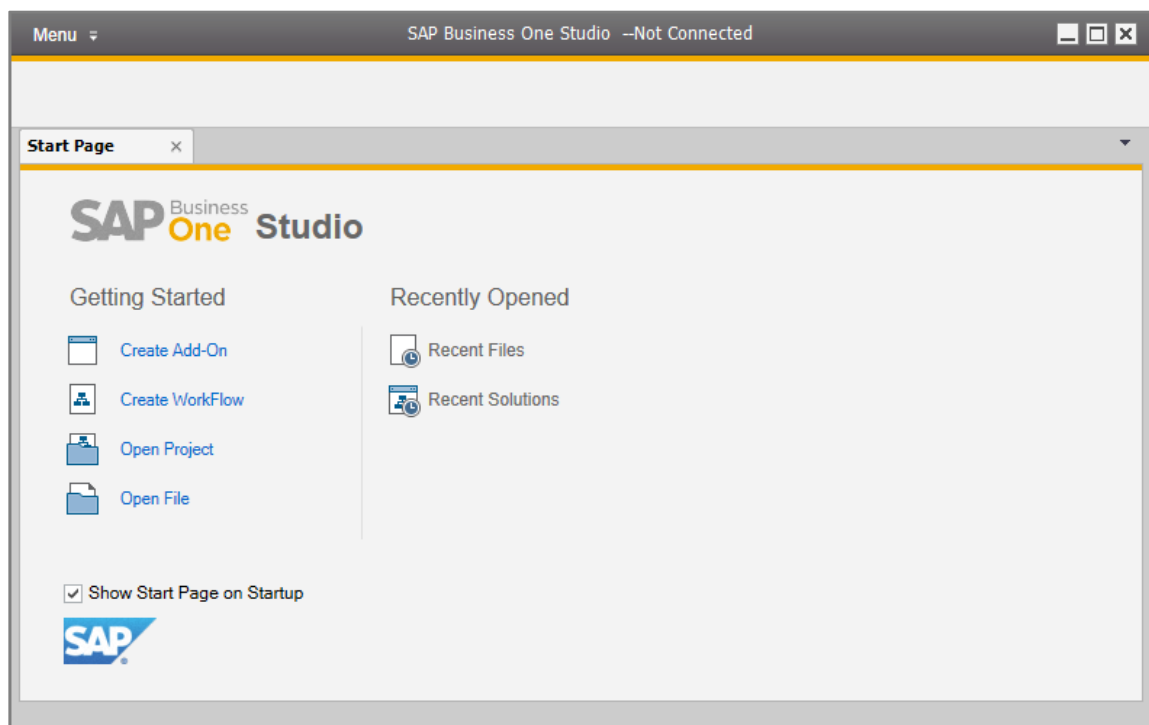


Figure 6. SAP Business One Studio

SAP Business One Studio as an open platform is based on .NET framework and is designed to offer two types of development forms, Add-on designer and Workflow Designer. Through this framework, the developers can choose between editing and modifying the current functions as well as adding new ones. SAP Business One Studio can be used in two editions: SAP Business One Studio and SAP Business One Studio for Microsoft Visual Studio. SAP Business One Studio and SAP Business One Studio for Microsoft Visual Studio both use file extension (. b1s). In order to install SAP Business One studio, first we should install Microsoft **.NET Framework 4.0**. Klinkoff et al. (2007) points out that .NET framework is a development and runtime platform through which the machine independent byte-code is performed by a virtual machine and an important feature of this framework is that it allows access to native libraries in order to support legacy code. The .NET framework offers to use multiple programming languages such as VB.NET, C#, C++. Most developers use both platforms of SAP Business One Studio where they first design the GUI and after that, on the same file they can program using C# and SQL server database. The main window of SAP Business One Cloud is divided into following functionalities: menu buttons toolbars, design area and tool windows.

Every business organization has special requirements from the ERP software they are implementing. The advantage of SAP Business One Cloud software is that through **Add-on Projects**, which can be developed with SAP Business One Studio, it can offer different solutions for specific requirements of business organizations. Add-on projects are small software solutions, which are very useful for expanding the business functions of SAP Business One software in the production, distribution, service or retail sector. After the development process based on the specific requirements of business organization, the add-on projects need to be licensed from SAP and after that the installation of SAP Add-on goes through the SAP Business One Administration module where we should choose Add-on Administration from the menu.

2.4 Cloud ERP System Implementation Life Cycle

After selecting the right ERP system for the business organization, the next step is to prepare the plan and install the system. The implementation of ERP system inside the business organization is not an easy process because the whole process is connected with many issues, which affect the successful implementation. Therefore, the factors which affect successful ERP implementation can be divided into technological and managerial factors. Managerial factors are related to managing changes inside the business organization, creating a schedule for implementation, training the staff and dealing with resistance to change. On the other hand, the technological issues are related to finding the right hardware for the system implementation. According to Umble et al. (2003), the successful implementation of ERP depends on the following factors, which have also been presented in Figure 6: excellent project management, clear understanding of strategic goals, commitment by top management, organizational change management, a great implementation team, data accuracy, extensive education and training, focused performance measures and multi-site issues.

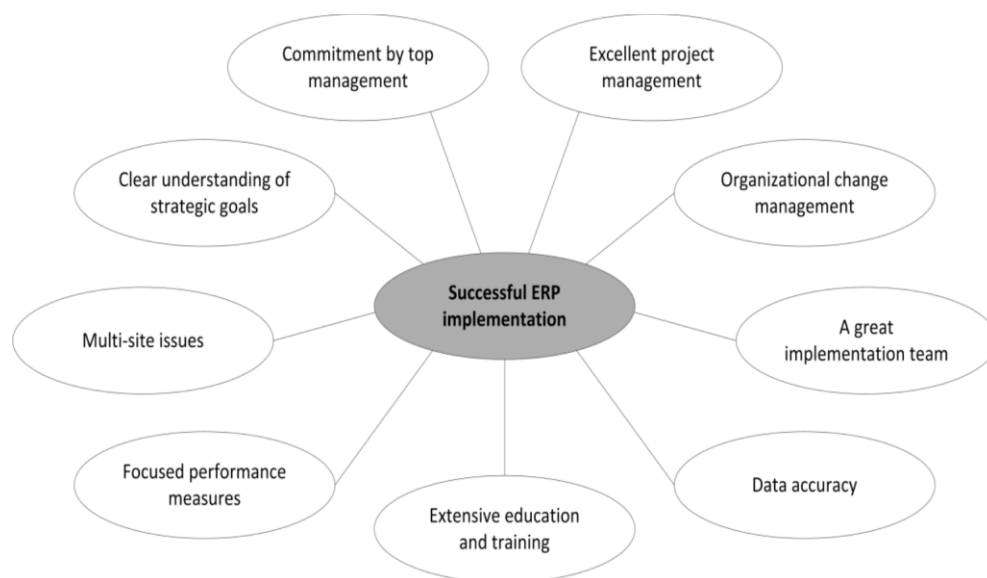


Figure 7. The nine essential factors affecting a successful implementation of an ERP system (Source: Umble et al., 2003)

The ERP implementation team should calculate the cost and train the employees who will be engaged in the implementation process before the start of data migration. Shatat (2015) concludes that the most important Critical Success Factors (CSFs) that should be considered during the ERP implementation are: Top Management Support, User Involvement, Clear Goals & Objectives, Strategic IT Planning, User Training & Education, Vendor Support, Teamwork & Composition, Project Champion, Monitoring & Evaluation of Performance, and Education on new Business Processes. After the successful implementation and go live of ERP system, it is very important to manage the after-implementation process in order for the system to be functional in all the departments of the business organization.

2.4.1 Phases in ERP Implementation

The same as other projects, Cloud ERP Implementation goes through many phases. The phases of ERP implementation can be divided in to three categories: preparation phase, implementation phase and maintenance and support phase. According to Kyselica (2018), the goal of the preparation phase is to process the information strategy of the management decision on implementing an ERP system into such a method that the information contained in the prepared strategy to be used for starting the implementation process. One of the best strategies of SAP ERP software implementation is **ASAP (Accelerated SAP methodology)** methodology which was first released in January 2007. ASAP methodology of implementation goes in to five phases: Project Preparation, Business Blueprint, Project Realization, Final Preparation and Go-Live and Support. In a study about successful methodology for enterprise resource planning (ERP) implementation, Lutovac and Manojlov (2012) conclude that the ASAP methodology offers a demonstrated and secure method for managing an implementation of SAP ERP project and it covers the implementation, upgrade, strategic studies, though it is really important that the executive management of the business organization participates as a control factor in each phase of the ERP implementation. Măzăreanu (2013) highlights that the success of any business organization depends on how effective the information

system is inside where any interruption of the information system, will lead to business loss. Therefore, there are four elements for successful project management: process, technology, people and content. The implementation phase is where should well analyze the capabilities of the business organization based on the previous information and every step of implementation and project management should be planned. During the third phase, every part of the new system should be tested and reported if there is any error. Narayanaswamy et al. (2013) highlight that by having a mutual understanding of influences of implementing cloud ERP system, the project manager can have more power with team members to finish tasks, increase productivity, change course or engage in other behaviors of the business organization.

2.4.2 Management Issues in Implementing Cloud ERP Systems

Every change for the business organization is a challenge; the implementation process of Cloud ERP system is not an exception. The process of implementation should be very well prepared in advance in order to have a successful final phase. The success of implementation depends on the plan and coordination of Cloud ERP implementation management team. Hongjiang et al. (2011) point out that in business organizations, the reaction of employees to a new system implementation and use often takes the form of passive resistance to change existing processes, which can lead to many implementation problems. The resistance to change is a very important factor that the management of the project of implementation should consider, especially in those business organizations which utilize any form of ERP. In general, the management issues for implementing the cloud ERP system in business organizations is related to people and administrative issues but project managers should also consider the role of Business Process Reengineering (BPR). In order not to deal with resistance to change, the management of the business organization should implement some strategies such as training, communication, resistance management and coaching. According to Sankar and Rau (2006), the top management support is crucial for the implementation of ERP

systems where they highlight that the change management life cycle have many phases, which are described on Figure 8:

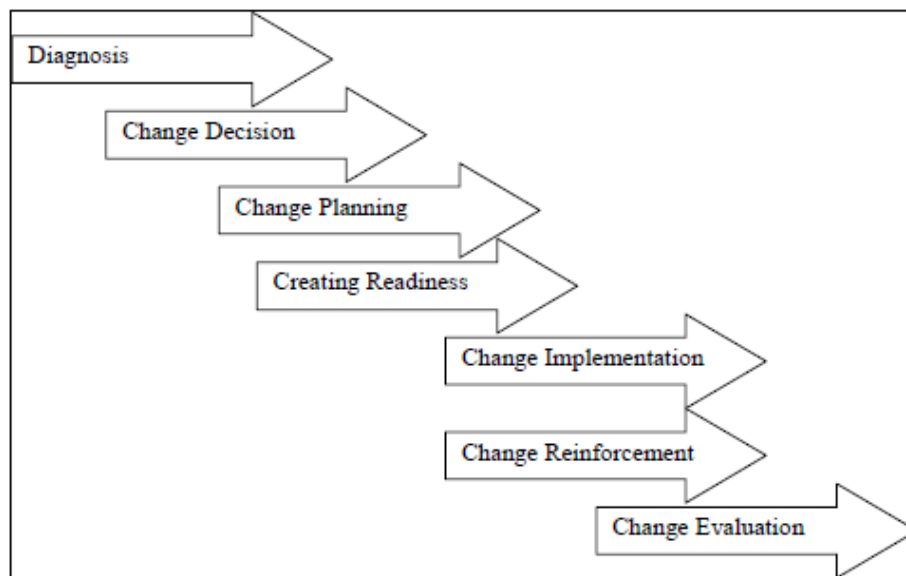


Figure 8. Change management life cycle (Source: Sankar & Rau, 2006)

In a book by Sankar and Rau (2006), it is highlighted that the implementation strategy of ERP system defines how the implementation should be realized, and according them, there are three possible implementation strategies: step-by-step, big bang, and roll out.

2.4.3 Technical Issues in Implementing Cloud ERP Systems

Even though the implementation of ERP System is not an IT project but is more connected with the change management issues, there are some technical issues that every manager and business organization should consider. One important technical issue is data synchronization. According to Sankar and Rau (2006), most of the ERP system implementations consist of a set of data that defines the entities and relationships in a business organization where the architecture, the networks that connect the databases, and the ERP software that is used to query the database define how fast and precisely data can be retrieved for implementation. The IT infrastructure of the business organization plays a vital role in the successful implementation of Cloud ERP system. Hao et al. (2012) point out that the implementation process of the cloud ERP system depends

on the request of business organization related to ERP modules that they need and this process has numerous procedures such as setting parameters into the system, changing the interface layers and migrating the data. The technical issues of cloud ERP system are also related with the technical support that the IT department should provide to all the departments of the business organization after the implementation and installation of the new ERP software.

2.4.4 Risks in ERP Implementation

During the configuration of ERP systems, some potential security configurations might occur that every manager of the business organization should take into consideration. According to Mary Sumner (2005), there are several risks that the business organization should consider during the ERP implementation and they are as follows: Technological risks that are related to the new technology which involves organization, people and project size and Organizational risks that point to the organizational factors when the business processes are redesigned, the risk of excessive time and rise of cost investments.

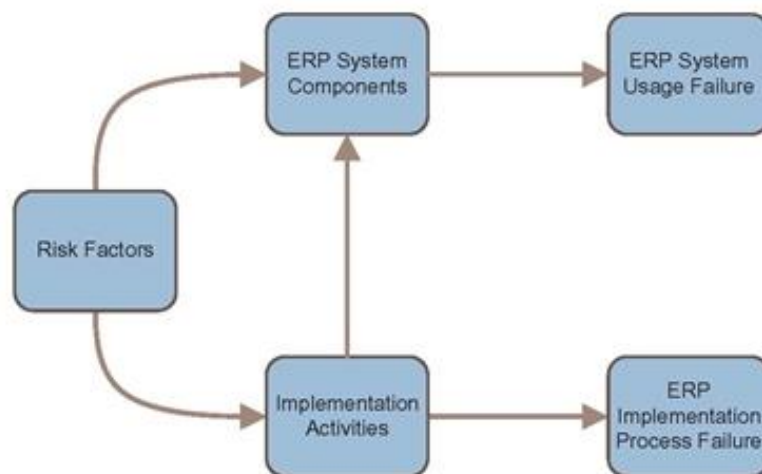


Figure 9. Risk factors on ERP projects (Source: Zeng and Skibniewski (2013))

In a study conducted by Zeng and Skibniewski (2013) about the risk assessment for enterprise resource planning (ERP) system implementations, it is pointed out that using

a deductive approach such as fault tree analyses, risk factors that are presented on Figure 8 can affect the individual components, which influence the implementation success in general. From Figure 8, we can conclude that Risk Factors play an important role in successful implementation of ERP software; therefore, the management of the business organization should consider these factors and develop a plan to overcome risks and implement the ERP project successfully. A good strategy to avoid the risk of ERP implementation in different business organizations is to select already tested ERP software from known ERP providers. In a study by Pabedinskaitė (2010) conducted in various business organizations in Lithuania, it is pointed out that users of ERP software consider that factors related to management of implementation are the most important factors that influence the implementation of ERP system.

2.4.5 Controlling the Risks of ERP implementation

The same as in other IT projects, in the ERP implementation process, it is very important to control the risk in order to successfully implement the ERP software inside the business organization. The risk can be controlled by selecting the best ERP software, which suits the infrastructure of the business organization. Grabski et al. (2001) point out that the success of an ERP system implementation depends on identifying the main business risks and the controls that need to be put in place to minimize those risks during implementation. The risk during ERP implementation can be of a different nature and can be categorized as environmental, functional and technical risk. In order to control the risk during ERP implementation, the manager should plan and follow all the rules of the implementation process. Sumner (2005) highlights that, during the ERP Implementation process, there are four risk categories: technology, organization, people and project size. Technology risk depends on the connection of current IT infrastructure with new ERP system; the organization risk is related to business processes of the business organization; the people risk is associated with the knowledge of IT staff to implement the ERP system; and the project size risk deals with the size of the project and the organization capability to manage the implementation process.

3. METHODOLOGY

In this chapter, we will describe the methodology that is used to conduct this study. This research is mainly based on both case study implementation and quantitative research. The starting point of the research is to analyze and implement the cloud-based ERP software, continuing with programming and developing the add-on software based on the requirements of the business organization and as a final step measuring user experience and opinion of the employees on the business organization.

3.1 Research Strategy

The objective of this study is to evaluate and implement SAP Business One ERP software in the cloud by developing add-on projects and analyzing the opinion of the users after the finalization of the implementation and development process. This research is based on a single case study approach and it is divided into three phases. The first phase includes the observation and analysis of the technical requirements for successful implementation of SAP Business One Cloud ERP solution at JYSK. During the first phase, the implementation of SAP Business One is also conducted. The second phase represents the development of add-on projects with SAP Business One Studio based on specific requirements and operation procedures of JYSK. During the third phase of this research, user experience and the opinion of JYSK employees regarding the new installed SAP Business One Cloud ERP software has been surveyed using a questionnaire. The study population of this phase of the research is 75 employees from the retail Chain JYSK.

3.2 Research procedure

The first step of this research is to define the research field and the purpose of the thesis. After that, we continue with the first contact with the business organization where we will conduct the research. The first meeting was with the top management of JYSK where the project phases, the plan and time planned for the successful implementation and closure of the project were explained in details. After that, the meetings and other planning are done with the managers of different sectors with whom

we have formed a special team for the implementation and testing of the SAP Business One software. With this team, we have defined all the necessary steps for the implementation of the software, and we have divided the tasks and responsibilities for each of the participants. The implementation stages of the project have been determined through a Gantt chart, and the specific requirements of the business organization that should be present in the new software have been analyzed and defined in detail. Based on the specific requirements of the operation procedures of JYSK, the development of add-on projects is coded with C# through .NET framework and SAP Business One Studio software solution. After the development of add-on projects and successful implementation of ERP system, by approving permission from the high management of the business organization a field questionnaire will be conducted with all the employees that will use the software for their daily tasks in the future.

3.3 Data Collection

In order to clarify the third hypothesis of this study, a questionnaire was conducted with all the employees in the company in question, JYSK. The questionnaire consisted of close-ended questions which we thought will be better for our study in order to gain simple and analyzable results. The questionnaire with the instructions was delivered to all the employees of JYSK. Once the data of the printed questionnaire were collected, the next step was to convert them into an electronic format. The data were processed with SPSS 23 software for analyzing the Cronbach Alpha and reliability analysis.

3.4 Research Design

This research is made of three parts; in each part a hypothesis, which we have set as an objective at the beginning has been analyzed. Each part of the study is different from each other, both in terms of content and research methodology. In order to answer the first hypothesis of this study about the factors affecting the implementation of cloud-based ERP software in small and medium-sized enterprises (SMEs), SAP Business One cloud-based ERP software was implemented at the retail chain JYSK and an empirical

research is done based on the direct observation of the experiment. A mixed method of research was used for planning and implementing the cloud-based ERP software. The second part of this research includes the design and development of add-on projects through which we will try to find the best answer to the second research question about the necessary requirements of developing an add-on project with SAP Business One Studio based on the specific requirements of the business organization in the case study. This part includes the development of new features of ERP that are not available in the current system and which the research results demonstrate. In order to answer the third hypothesis of this study, a survey was conducted. For collecting the data on employee's opinion about the SAP Business One software performance at their business organization, we used the instrument taken from the master thesis of Xun Liu (2014) from the University of Uppsala. Firstly, the questionnaire was translated from English into Macedonian and Albanian, by taking care to keep the original meaning.

3.5 Measuring Instrument

Regarding the first hypothesis of this study, the information was obtained from the implementation process of cloud-based ERP at the case study company JYSK, where all the necessary information was collected through observation. All the key factors that are important for the implementation process were detected and all the activity has been documented. Through the conducted case study two ERP systems were compared, the traditional ERP system that is currently used by the case study business organization and the new cloud-based ERP system that is planned to be implemented. This would give us the opportunity to determine which system is the best and better suits the needs of the case study business organization. The results of the second hypothesis of this study were obtained through the experimental method conducted at the case study business organization where the possibility to adapt an existing software solution like SAP Business One Cloud with the operational and technical requirements of the case study business organization would be tested. The experiment included the development of add-on software with C# and SAP Business One Studio. In order to explain the third

hypothesis about the opinion of employees regarding the SAP Business One Cloud software performance, a questionnaire was conducted. The instrument was taken from the master thesis of Xun Liu (2014) about the usability analysis of working with SAP at Volvo Group. The questionnaire consisted of 12 closed questions and it supports Likert metering scale items. Each question offers five possibilities of measurement scale with the following ranking: 1 (I totally disagree), 2 (Disagree), 3 (Neutral), 4 (Agree) and 5 (Fully agree). As part of the questionnaire, there was also a measuring instrument regarding the demographics, which acted as a controlling variable of the other part of the questionnaire. The first part of the questionnaire consisted of six demographic questions, which included: gender, age, work experience, position, city, education.

3.6 Sample Determination

Regarding the third hypothesis of this study, the target sample was the employees of JYSK North Macedonia with a confidence interval ± 5 and confidence level 99%. From the total number of 85 employees, the sample for this study turned to be 75 subjects. Part of this study were all the users of the new ERP software, including managers and executives. The introduction part of the questionnaire consisted of information and guidelines of the projects as well as information about the anonymity and timing of the questionnaire. Every participant in this questionnaire, after agreeing to participate in this study, was required to sign an informed consent document.

3.7 Ethics

This paper was based on some ethical norms in order to preserve its seriousness and importance. Taking into account the fact that this research was developed in a private business organization, the management of the business organization was informed in details about each step of the study and implementation. In the same way, the employees who were part of this study were informed about the all the steps and procedures of the research. The anonymity of this study was explained as well as the duration of the research, including the security of the information that they presented.

4. RESULTS

This chapter of the study represents the results of the implementation of ERP SAP Business One Cloud through ASAP methodology of implementation, development of Add-on software for SAP Business One based on the requirements of the case study business organization and conducted questionnaire at retail chain JYSK.

4.1 Implementation of SAP Business One - Case Study JYSK

In order to analyze the first hypothesis of this study (***What are the factors affecting the implementation of cloud-based ERP software in small and medium-sized enterprises (SMEs)?***), we have implemented SAP Business One Cloud software at the case study business organization. JYSK as a franchise company have very organized structure of information management at their Headquarters. They use different models of information management in order for all the processes to be well organized.

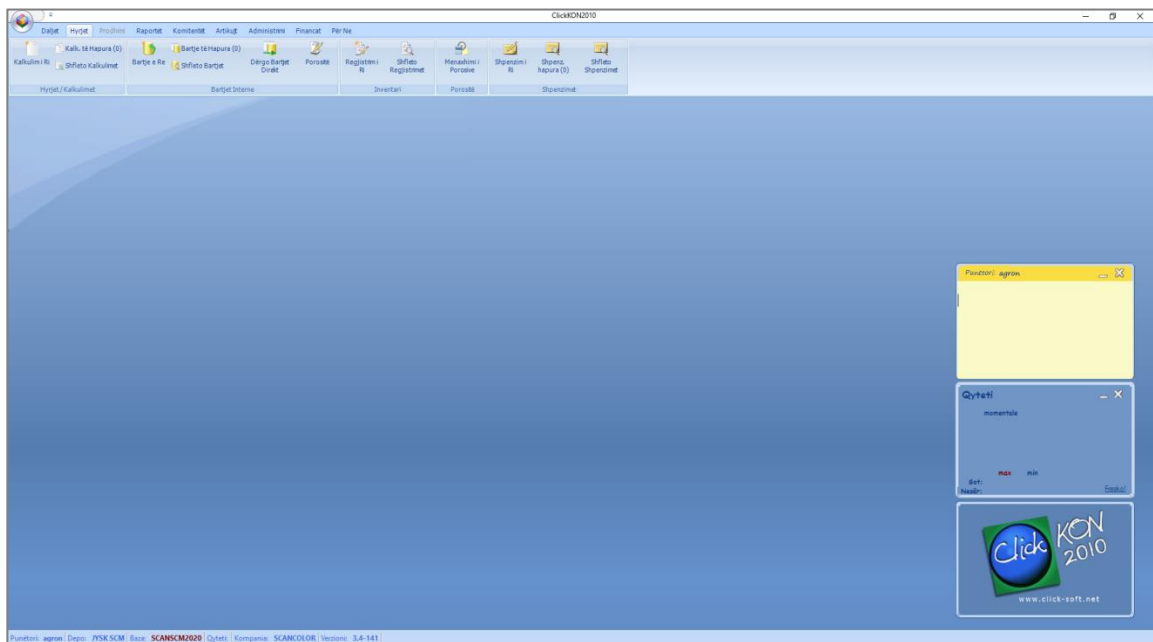


Figure 10. ClickKON user interface at JYSK

JYSK uses all the modules of SAP for the whole supply chain management of the company. The warehouse of the company also uses the SAP system. That is not the

situation with franchise stores around the world. For the moment, the company is using an old ERP Software called ClickKON and another software application only for accounting purposes, called Zonel, which are Windows based solutions. The B2B integration at JYSK is active from the headquarter where they use SAP system for the whole supply chain of the company as well as for contacting and managing the retailers. B2C integration option is the option that the management of the company always cares about and invests on different technologies to serve in the costumers better. All the stores use an old ERP Software called ClickKON with interface in Albanian Language only, which we can see in Figure 10. The ERP Software functions locally, and does not have connections with the stock of other stores as well as with other departments. The company is not active online, they only have an informational web page about the products and they do not offer ecommerce. Before the whole process of change of ERP software and implementation started, the first dilemma was which method of implementation we would continue with. After many analyzes, we decided to choose the ASAP implementation method for the implementation of SAP Business One in JYSK. This is a well-known method of implementation used by SAP. ASAP methodology, as we have mentioned in literature review chapter, has five phases of implementation which can be seen in Figure 11.

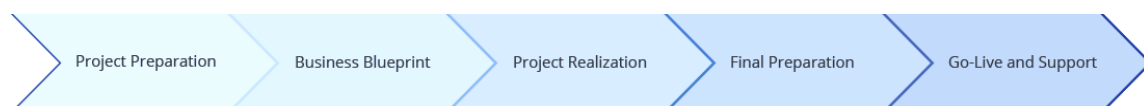


Figure 11. ASAP Five phases of SAP Business One Cloud implementation

Project Preparation was the first phase where we developed the plan and preparation for the whole implementation process. During this phase, we held the first Kick-off Meeting with the project manager and account manager where we discussed all the project manager topics, technical issues and delivery and installation of the test system. Before we started to implement the new ERP system, we analyzed the current state of operation, the technology they use, the software they use and all the errors and positions where there is still space for improvement. During the Kick-off meeting there,

the sales team was also present. We analyzed their Server and Client system configuration and we concluded that the minimum technical requirements in order to implement SAP Business One Cloud were: Microsoft Windows Server 2008 R2 Standard edition or Enterprise edition, Microsoft SQL Server 2017, Microsoft IIS configuration, Microsoft Office, SAP Business ONE installation CD, SAP Business Objects Crystal Reports CD. We checked and confirmed that the JYSK system meets all technical requirements and that they were sufficient to implement SAP Business One Cloud software. During this phase, we signed all the necessary documents for installing SAP Business One Cloud at JYSK and all the objectives and requirements from the management of the company were defined. The main task during this phase was to form the best team, which would work on the implementation of ERP.

Business Blueprint is the phase where we defined with the executive management of the case business organization the schedule, plan and objective of the project. We discussed all the standard operation procedures (SOP) that they are operating at the moment. We created and signed the blueprint document of the business organization. We defined the scope and the milestone of the implementation project. Some of the questions that we clarified during this phase were about the information that the managers capture during purchase orders. Another issue that we documented was about the marketing campaigns and their implementation on the system because the case study business organization as part of their sales procedure implements a campaign in the system every week. The finance module was discussed due to different legislative and tax procedures in the country.

Project Realization was the most important phase of software implementation where we implemented all processes, issues and technical requirements that were discussed during the two previous phases. During this phase, we began to configure SAP Business One. Based on the blueprint of case study business organization, we started to install the software. In order to have access through a web browser, we installed some third-party components. Based on the suggested steps of configuring the server from the SAP

Business One Cloud Administrator's Guide, at JYSK we configured and installed the following third-party components:

| |
|--|
| 1. Windows time server |
| 2. Domain controller |
| 3. Database configuration |
| 4. Certificates Installation |
| 5. License server Installation |
| 6. Remote support platform for SAP Business One Installation |
| 7. Presentation server farm configuration |
| 8. Job service configuration |

Because SAP Business One Cloud is a web-based application, we also configured the TCP/IP ports based on the default list of the software. Another technical issue that we configured before the installation was the Windows timeserver because all the machines that use the software must use common time and, on the other side, we configured the domain controller, which we needed for administration and security management of the network. The database was configured with Microsoft SQL server through Database Instance Registration form and for both database and SQL we made a backup. During the installation of SAP Business One Cloud, we also undertook the following steps: installation of the System Landscape Directory and the Cloud Control Center, installation of the SLD Agent Service, and creation of the software repository. After baseline configuration of SAP Business One Cloud, the next step was the analyses of specific requirements of the management of the case study business organization. All the requirements were defined during the previous phase. Since the business organization was functioning with another software, as an important part of the installation of the new system was data migration, which we finished successfully, which means that all the previous data were connected to SAP Business One Cloud software and users would have the opportunity to use them. System testing was the next step we took. During this phase, we tested the completed system and all the requests and processes defined by the management of the case study business organization. We reviewed all important documents such as reports, orders, invoices, reservation, pro-forma and financial

statement documents. Below, in Figure 12, we can see the baseline version of the SAP Business One Cloud that we installed at our case study business organization.

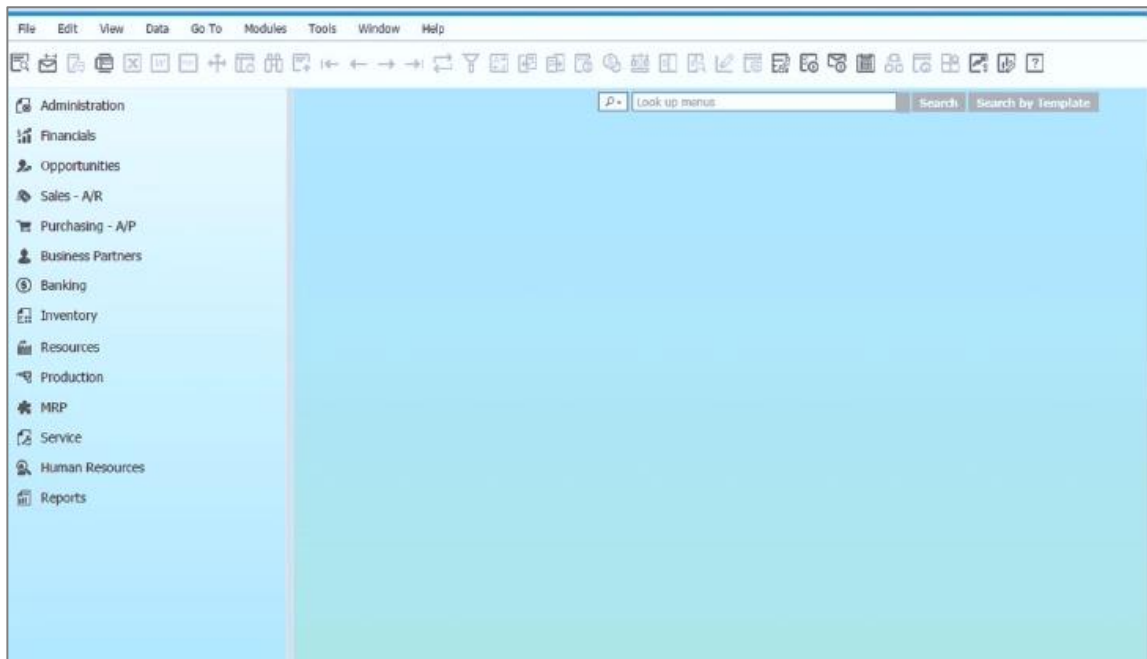


Figure 12. SAP Business One Cloud

During the process of validation and testing all the leaders and managers of the project were present in order to better understand the whole process of installation as well as to eliminate all bugs and obstacles of the newly installed SAP Business One ERP software. We defined training methods and schedule for all users of the new system, where we agreed for most of the trainings to last 15-30 minutes per module and the topics to be based on real life examples.

Some of the training sessions were online where all the users of the new software were equipped with a username and password from the SAP Customer Portal. After a final check at this stage, we reviewed all documents and sign-offs from the case study business organization.

Final Preparation was the phase where we completed testing, training of the system management of the installation process and resolved of all open issues. We started this phase by training the key users and the administrators of JYSK. This was a very important

step because if the key users understand the system better, they can explain it to other users. Another team was engaged in testing or readiness of new system before going live, the user acceptance testing and analyses of their feedback. Based on the user feedback and required changes, we reconfigured the system and prepared the SAP Business One Cloud for the last phase of implementation.

Go-Live and Support is the final phase of the implementation process based on ASAP methodology where we finished all the procedures and tested live SAP Business One Cloud at JYSK by managing all the processes and daily activities.

The old ERP System would not be used anymore and all the procedures and daily activities were carried out through SAP Business One Cloud software. A dedicated support team was created for post implementation process of SAP Business One Cloud at JYSK, which would be engaged in supporting the key users of the business organization during the Go Live phase as well as after the finalization of the implementation process. Post-production support is very important for solving different technical or managerial issues that might happen during the post-implementation phase.

4.2 Development of Add-on software, possibilities and solutions

SAP Business One Cloud as an ERP solution covers most of the functions for different departments inside a business organization. The same applies to our case study business organization, where based on their demand and daily procedures, there are some functions that the basic software does not cover. A good thing about SAP Business One Cloud is that all those features that are not covered by the basic software can be programmed as special programs that are known as Add-on software. For that reason, during the second phase of the implementation of SAP Business One Cloud at JYSK, together with the top management, we identified all those functions that needed to be coded and developed as separate software. JYSK, as part of the successful operation and sales, every two weeks organizes various marketing campaigns, which should also be applied in to the ERP system, because all the prices and combinations of products depend on this function. For this reason, as the first Add-On software to be developed

for JYSK, was that for marketing campaigns. The development of the Add-On project was done with SAP Business One Studio, C# and SQL database. We installed all the necessary software for Add-On software development which included Microsoft .NET Framework 4.0 and SAP Business One Studio. In order to declare the object in SAP Business One Cloud at our case study business organization, the following syntax from SAP Blogs was modified for JYSK Add-on:

```
/* Title: <Connect to the Data Interface>
 * Author: <SAP Blogs>
 * Date: <July 28, 2014>
 * Code version: <Source code>
 * Availability: <https://blogs.sap.com/2014/07/28/connecting-an-add-on-to-sap-business-one/>
 */
private static SAPbobsCOM.Company _company;
private static int ConnectDI()
{
    int returnValue = -1;
    _company = new SAPbobsCOM.Company();
    _company.Server = "10.10.0.1";
    _company.DbServerType = BoDataServerTypes.dst_MSSQL2008;
    _company.CompanyDB = "DB_JYSKMK";
    _company.LicenseServer = "10.10.0.1:30000";
    _company.UserName = "admin";
    _company.Password = "Pwd1911#";
    _company.Language = SAPbobsCOM.BoSuppLangs.ln_English
    Try
    {
        returnValue = _company.Connect();
    }
    catch (Exception exception)
    {
        Console.WriteLine("Exception occurred: {0}", exception.Message);
    }
    return returnValue;
}
```

The first step we took in order to connect the Add-on with SAP Business One Cloud was the connection to the data interface. With this type of connection, this code will give access to all the SAP Business One API. The following code from SAP Blogs was used in

order to close the connection and after the completion of coding of the add-on software at our case study business organization:

```
int diConnect = ConnectDI();

if (0 == diConnect)

{

    _company.Disconnect();

} Marshal.FinalReleaseComObject(_company);
```

The next phase of development was developing the add-on software for managing the campaigns of our case study company JYSK. Currently they have this feature implemented at the old software ClickKon, which we can see in Figure 13:

| Shifra | Përshkrimi | Fillimi | Fundi | Numri artikujve | Statusi | Vlera | Punëtori |
|--------|-----------------------|-----------|-----------|-----------------|---------|-----------|----------|
| kmp18 | Dinning table + ch... | 1/3/2020 | 1/16/2020 | 2 | Aktive | 12,999.00 | Abil |
| kmp19 | Mattress 90x200 ... | 1/17/2020 | 1/30/2020 | 2 | Aktive | 14,999.00 | Luljeta |
| kmp21 | VEDDE + WELLPUR... | 1/17/2020 | 1/30/2020 | 2 | Aktive | 19,999.00 | Liris |
| kmp22 | VEDDE + WELLPUR... | 1/17/2020 | 1/30/2020 | 2 | Aktive | 21,999.00 | Liris |
| kmp23 | VEDDE + WELLPUR... | 1/17/2020 | 1/30/2020 | 2 | Aktive | 24,999.00 | Liris |
| kmp24 | Duvet KUNNA war... | 1/17/2020 | 1/18/2020 | 2 | Aktive | 1,199.00 | Abil |
| kmp25 | Duvet KUNNA war... | 1/17/2020 | 1/30/2020 | 2 | Aktive | 1,199.00 | Ali |
| kmp26 | Dining table GAM... | 1/31/2020 | 2/13/2020 | 2 | Aktive | 12,999.00 | Abil |
| kmp27 | Dining table GAM... | 1/31/2020 | 2/13/2020 | 2 | Aktive | 12,999.00 | Abil |
| kmp28 | GAMMELGAB 160/... | 1/31/2020 | 2/13/2020 | 2 | Aktive | 17,999.00 | Abil |
| kmp29 | GAMMELGAB 160/... | 1/31/2020 | 2/13/2020 | 2 | Aktive | 17,999.00 | Abil |
| kmp30 | Dinning table VED... | 2/28/2020 | 3/12/2020 | 2 | Aktive | 9,999.00 | Abil |

Figure 13. ClickKon Campaign module of managing marketing campaigns

In order to have the same function at SAP Business One Cloud software, we added a new option button for Campaigns under Administration module. This feature was been added to the Administration menu section as a separate option on the list for campaign management. After the user chooses this option, a new window is shown, in which all the necessary options for coordinating group campaigns are presented. By selecting this option, SAP Business One Cloud users will have the opportunity to manage their

campaigns by importing Excel external files with regular or sale prices and group them into group campaigns. The same coding procedure can be practiced for all the other options that we want to add to the main menu of the software only by changing the SAP menu ID, which, in our case, was 3328 for the Administration Module. The code for adding items on the menu list was modified from SAP with the following syntax:

```
/* Title: <Adding a Menu Item to The Main Menu>
* Author: <SAP Community>
* Date: <Jan 18, 2007>
* Code version: <Source code>
* Availability: < https://answers.sap.com/questions/1932157/adding-a-menu-item-to-the-
main-menu.html>*/

SAPbouiCOM.Menus oMenus = null;

SAPbouiCOM.MenuItem oMenuItem = null;

oMenus = SBO_Application.Menus;

SAPbouiCOM.MenuCreationParams oCreationPackage = null;

oCreationPackage = ( ( SAPbouiCOM.MenuCreationParams )(

SBO_Application.CreateObject(

SAPbouiCOM.BoCreatableObjectType.cot_MenuCreationParams ) ) );

oMenuItem = SBO_Application.Menus.Item( "3328" ); try{

oMenus.AddEx( oCreationPackage );

oMenuItem = SBO_Application.Menus.Item( "3328" );

oMenus = oMenuItem.SubMenus;

oCreationPackage.Type = SAPbouiCOM.BoMenuType.mt_STRING;

oCreationPackage.UniqueID = "Campaigns";

oCreationPackage.String = "Campaigns";

oMenus.AddEx( oCreationPackage ); }
```

After adding the Campaign function on the Administration module list, the next step was to design and develop the form with the buttons. We modified from SAP Community the following code for designing and programming the form and buttons:

```

/* Title: <Manually Creating Events for Button>
* Author: <Ranu Vijay>
* Date: <Sep 06, 2018>
* Code version: <Source code>
* Availability: < https://answers.sap.com/questions/627123/manually-creating-events-for-
button.html>*/

SAPbouiCOM.FormCreationParams oCreationParams = null;

oCreationParams =
((SAPbouiCOM.FormCreationParams(SBO_Application.CreateObject(SAPbouiCOM.BoCreatableObjectType.c
ot_FormCreationParams)));

oCreationParams.BorderStyle = SAPbouiCOM.BoFormBorderStyle.fbs_Fixed;

oCreationParams.UniqueID = "Campaign Administrator";

oForm = SBO_Application.Forms.AddEx(oCreationParams);

oForm.Title = "Campaign Administrator";

oForm.Left = 400;

oForm.Top = 100;

oForm.ClientHeight = 800;

oForm.ClientWidth = 600;

```

The buttons of the page were modified from the same source with the following code:

```

SAPbouiCOM.Button oButton = null;

oItem = oForm.Items.Add("Button1", SAPbouiCOM.BoFormItemTypes.it_BUTTON);

oItem.Left = 6;

oItem.Width = 65;

oItem.Top = 51;

oItem.Height = 19;

oItem.Enabled = true;

oButton = ((SAPbouiCOM.Button)(oItem.Specific));

oButton.Caption = "Add Campaign";

```

All marketing analyzes, individual campaigns and group campaigns take place in Excel, where after the analysis is completed and the final form is established, they are imported into ClickOn software through a special module. The same was required from us to implement through the Add-On software in SAP Business One Cloud. The code below modified from Stack Overflow webpage is for importing the Excel file directly to SAP Business One Campaign Manager module:

```
/* Title: <Dialog box does not work for SAP Business One Add-On>
 * Author: <Stack Overflow>
 * Date: <Jan 13, 2013>
 * Code version: <Source code>
 * Availability: <https://stackoverflow.com/questions/17040978/dialog-box-does-not-work-for-sap-business-one-add-on>*/
private void GetFileHeader()
{
    using (GetFileNameClass oGetFileName = new GetFileNameClass())
    {
        oGetFileName.Filter = "Excel files (*.csv)|*.csv";
        oGetFileName.InitialDirectory =
Environment.GetFolderPath(Environment.SpecialFolder.Personal);
        Thread threadGetExcelFile = new Thread(new
ThreadStart(oGetFileName.GetFileName));
        threadGetExcelFile.SetApartmentState(ApartmentState.STA);
        try
        {
            threadGetExcelFile.Start();
            while (!threadGetExcelFile.IsAlive) ;
            Thread.Sleep(1);
            threadGetExcelFile.Join();
            var fileName = string.Empty;
            fileName = oGetFileName.FileName;

            if (fileName != string.Empty)
            {
                string connString = "";
                System.Data.DataTable dt = new System.Data.DataTable();
                connString = String.Format("Provider=Microsoft.ACE.OLEDB.12.0;Data
Source={0};Extended Properties=\"Excel 12.0;HDR=YES\"", fileName);
                OleDbConnection myConnection = new
OleDbConnection(connString);
```

The last development phase after the finalization of the Add-on software and saving it to .zip format through Extension Manager was to upload it to SAP Business One Cloud. The process of creating the installation file goes through Extension package where we created the extension package. The installation of Add-on was done through SAP Business One Administration module. After the installation, the users of SAP Business One at our case study business organization could use the new developed Add-on software for creating and coordinating the future marketing campaigns. The design of the form for managing the campaigns at JYSK case study has been shown in Figure 14.

| Kind | Link | Thumbnail | Name | Description | Code | Valid From | Valid To | Disabled | Show On | Ordering Number |
|-------|---------------------------------------|-----------|-----------------------------|----------------|--------|------------|------------|----------|---------|-----------------|
| paper | https://viewer.papers.io/scan-color/2 | | Festive offers go on and on | Save up to 65% | yysq4e | 20/11/2020 | 3/12/2020 | ✓ | | 1 |
| paper | https://viewer.papers.io/scan-color/2 | | New Arrivals | | 0b61e | 5/11/2020 | 31/12/2020 | ✓ | | 3 |
| paper | https://viewer.papers.io/scan-color/2 | | New Year Catalogue | | 4wa80 | 8/12/2020 | 31/12/2020 | ✓ | | 2 |

Showing 1 - 3 of 3 records

Processing time: 0.32sec / Total time: 122.50sec

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Figure 14. Campaign Manager form for SAP Business One Cloud

The same coding procedure was practiced for the development and coding of the other requested Add-On functions from which users will have the opportunity to manage individual campaigns. Individual campaigns are marketing campaigns which are mainly processed in Excel and imported into the program for short-term use. The configuration of Add-On software was done with Add-on Manager, through which we have configured all the settings, roles and web configuration as well as we registered the Add-On software at SAP Business One Cloud.

4.3 User experience regarding SAP Business One Cloud ERP software

After the process of installation and development of Add-On software at JYSK, in order to analyze the third hypothesis of this study about the user experience and their opinion regarding the new installed software SAP Business One, we conducted a questionnaire with all the employees. Therefore, this part of the study presents the results of the conducted research at our case study business organization JYSK. The results were collected through a printed questionnaire, which was delivered to 75 employees of JYSK, who were going to use the SAP Business One for their daily activities. The original version of the questionnaire was in English but because several employees at JYSK do not understand English, we translated the questionnaire into Albanian and Macedonian. In order to keep the meaning of the questionnaire, the translation was done in the relation as follows English - Albanian – English, and the same for the Macedonian language. All the questions of the questionnaire were mandatory. The results of the questionnaire were analyzed with SPSS 23 software and they were based on the reliability analyses and Pearson's Correlations. The first block of the questionnaire contained demographic questions about sex, age, job engagement, and department. Through demographic questions of this research, in the future, we can divide the results of the questionnaire by department, sex or age and we can analyze the opinion of specific department about the new installed ERP software.

| | Cronbach's Alpha | N of Items |
|---|------------------|------------|
| Employees opinion about SAP Business One Cloud software | 0.84 | 12 |

Table 1. The reliability of employees' opinion about SAP Business One Cloud

As a part of this research, the Cronbach Alpha coefficient also was calculated, which is used in order to find the consistency of the questions and answers of the questionnaire. The value of Cronbach Alpha coefficient has been presented in Table 1, from where we can see that the number of items is 12 and the number of subjects is N=75. Based on the

result of Cronbach's Alpha of 0.84, we can conclude that the credibility of the questionnaire has high inter-correlation and the questionnaire is reliable for the case we measure. The second block of the questionnaire contained questions about the usability of the new installed Cloud ERP, employees' readiness to learn the system and their opinion regarding the integration, complexity and customization of SAP Business One.

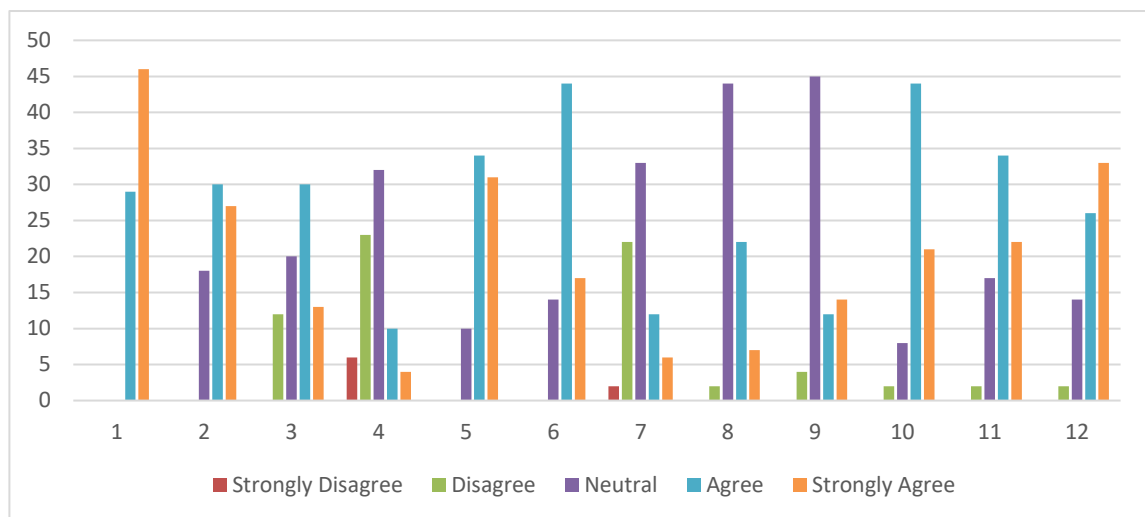


Figure 15. The results of the conducted questionnaire at JYSK

Above, in Figure 15, we have presented the results of the questionnaire, from where we can conclude that the employees of the Scandinavian retail chain JYSK are satisfied with the newly installed SAP Business One Cloud at their business organization. Regarding the first block of the questionnaire that included three questions about the usability and complexity of the new implemented Cloud ERP software, employees at JYSK, positively evaluated the SAP Business One Cloud ERP system, where 78% answered positively that they agree or strongly agree with the questions about usability and complexity of the system. Regarding the first question about the use of the new software in the future, all employees answered that they agree to use this system in the future. More precisely, the results have been presented in Table 16, from where we can see that 38% of employees strongly agree that SAP Business One Cloud is easier to use and helps them complete their tasks; 40% agree that the system is good for them, 17% are neutral and 5% disagree.

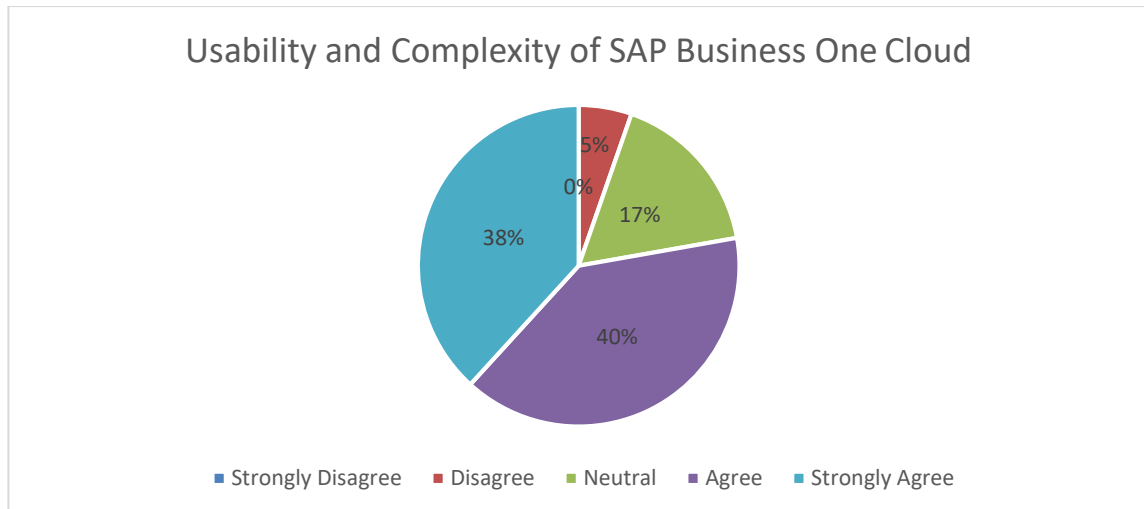


Figure 16. The results of the Usability and Complexity of SAP Business One Cloud

The second block of the questionnaire contained the next four questions about the knowledge and support of the employees to use SAP Business One Cloud, where employees at our case study business organization pointed out that despite the fact that the system is easy to use and understandable, it is important to have additional trainings and knowledge in order to use the software wisely in the future.

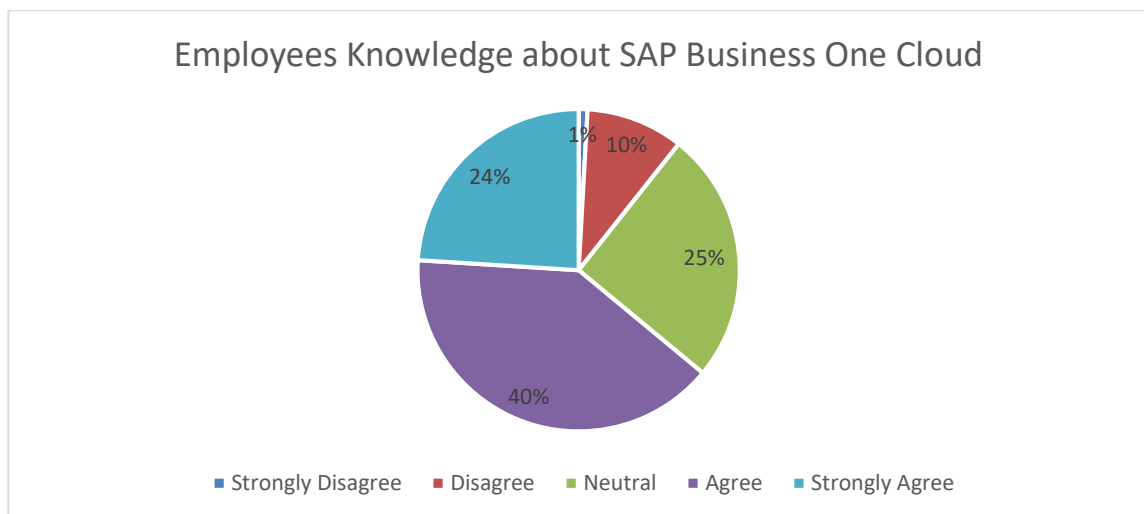


Figure 17. The results of the employee knowledge about SAP Business One Cloud

This is very important ranking which helps us to analyze if employees are ready to use the system and if they feel comfortable and have the confidence and knowledge to use

SAP B1 in performing their daily tasks. According to the result presented in Figure 17, we can see that percentage great deal of employees at JYSK (40%), agree that in order to use SAP Business One Cloud they would need assistance and additional knowledge and trainings. On the other side, 24% of the employees strongly agree that they will need additional assistance, 25% are neutral, 10% disagree and 1% strongly disagree.

The third block of questions contained five questions about the employees' opinion and experience about customization and navigation of SAP Business One Cloud. JYSK employees answered questions about how they see the new ERP system, whether it is easy to navigate and find the necessary information in SAP Business One Cloud, how much this software supports them in performing their daily tasks and how well they understand the system. The results of these questions have been presented in Figure 18.

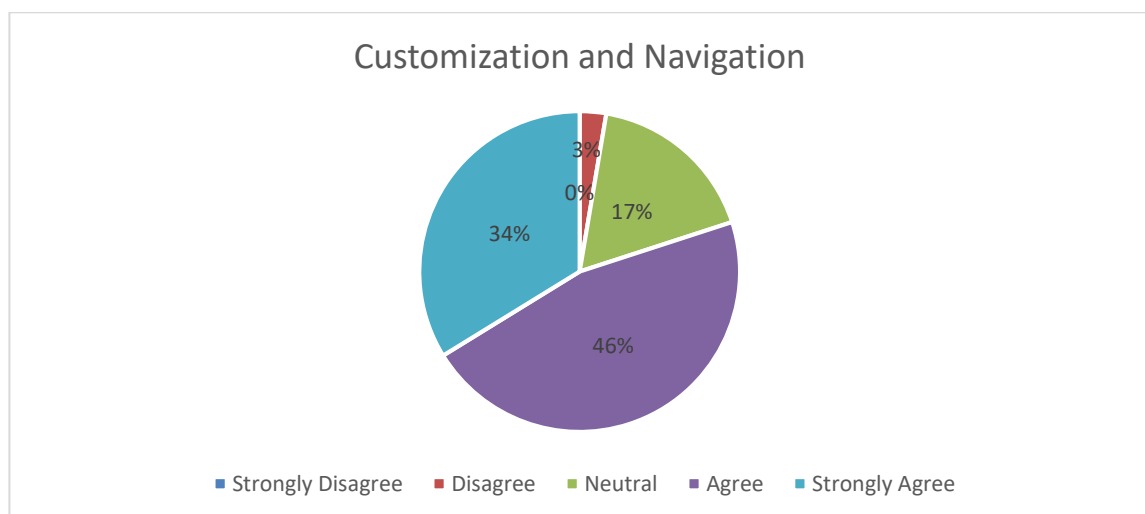


Figure 18. The results of navigation and customization of SAP Business One Cloud

Navigation is one of the most important features that users request from the new installed software. Based on the results from Figure 18, we can conclude that most of the users agree that SAP Business One Cloud is easy to use, where 34% strongly agree about this fact, 46% of the users agree and 17% are neutral. There is a small number of employees (3%), who think that new ERP system has bad navigation.

5. DISCUSSION AND CONCLUSIONS

5.1 Discussions

The main purpose of this study was to analyze the implementation of ERP System in the cloud, as well as to analyze the possibilities and the solutions that are present on the market. Based on the three methodological methods that we used to conduct this study, which included the implementation of SAP Business One Cloud, development of Add-on software, based on the request of the case study business organization, and the employees' questionnaire about the new installed Cloud ERP System, we can say that we have covered the whole circle of successful implementation of a Cloud ERP System at a retail type business organization. The obtained results of this study are sufficient to elaborate on our topic as well as to make comparisons with other relevant studies. In order to analyze the implementation of Cloud ERP system at our case study business organization as well as to verify the accuracy of the results obtained from the implementation of ERP software, the development of Add-on software and the questionnaire we conducted, this study has also been based on literature and studies related to this issue. During this section, the gained results of this study were compared with the results obtained from other studies; we will practice this in order to better elaborate the essence and the idea of this topic. The first part of the study presents an explanation about the implementation of Cloud ERP at JYSK, where we have clarified every step-in detail, from the first meeting with the management of the business organization to the training and testing of the employees during the last phase of implementation. Based on the related studies about this topic as well as based on the results that we gained from the implementation of SAP Business One Cloud at JYSK, we will try to explain the first hypothesis of this study:

H1. Technical factors affect the implementation of cloud-based ERP software in small and medium-sized enterprises (SMEs).

The implementation of SAP Business One Cloud at JYSK was successfully realized; all the employees after the training actively used the new cloud-based software and did not

present any problems or resistance to change. The implementation of ERP software would not be possible if the users did not collaborate and accept the change; therefore, we can say that the human factor is one of the most important factors in the successful implementation of ERP software. According to Yen *et al.* (2015), a successful Enterprise Resource Planning (ERP) system requires proactive users who use the software for their needs as well as recommend and teach other employees of the business organization. Based on the business nature of JYSK, the best choice by the company management is to install an ERP system based on Cloud. Another important factor that plays a crucial role in the successful implementation of cloud-based ERP software, is the information management, the way the business organization deals with the information, how they inform and prepare employees about the change. Elragal and El Kommos (2012) in a study about the comparison between in-house implementation of ERP systems versus the in-cloud implementations, conclude that most business organizations do not have the strength or will that motivate them to migrate their systems to the cloud, and this is because of lack of information, analyses and knowledge about cloud ERP. On the other hand, in a study about virtual investigation of grouping of on-premise and cloud ERP, Dwivedi and Sharma (2016) concluded that 47% of business organizations are not using cloud computing services; 23% do not know if they are using cloud services; and only 30% are aware of cloud services and are using them. It is therefore concluded that 60% of business organizations are not using cloud computing. The technology that business organizations choose to implement is another important factor. Nowadays, the trend is that most of business organizations are choosing cloud-based technologies for their everyday tasks and business. The same is the situation with ERP software where new business organizations are implementing cloud-based solutions, but there is also a trend by which some other organizations are moving their ERP system from traditional to cloud based. Another factor that has an impact on the implementation of Cloud ERP is the economic factor. As Cloud ERP is based on the web, and the hosting of data is done in different providers, business organizations are not obliged to buy hardware and licenses for software or installed technologies. In a study by Mahara (2013), it was concluded that

the economical perspective of the business organization is the main benefit by implementing ERP in the cloud, whereas the major threat are the technological issues like data backup, security, etc. The advantage of Cloud ERP systems is that business organizations do not need big IT staff for the system maintenance; all the upgrades and procedures are controlled and developed by the provider. How the business organization organizes its internal processes is an important factor in the implementation of ERP software. Does the business organization use digital ways of functioning? How do they regulate communication between departments? Bondarenko et al. (2010) concluded that document management, as a digital system, is flexible, where the methods for organizing paper documents allows the employees to choose a level of effort that they are willing to invest which is same as to expect benefit.

During the whole process of the implementation of ERP software, it is important to have the support of the executive management of the business organization, because the internal communication of the leadership directly affects the employees' approach during the whole process. In a study by Neves and Eisenberger (2012), they pointed out that the management communication inside the business organization has great impact and can influence any implemented change. Based on their study about a social services organization, held with 236 employees, it was concluded that management communication affects the performance of the business organization. Other technical factors that are important for most of the users of SAP Business One Cloud are data conversion and Reporting.

Every business organization, during their working processes, has various situations where they need to import or export data from the main software. Therefore, data conversion is an important technical factor for all the users of SAP Business One Cloud. Reporting it is an important technical factor because business organizations can manage the tasks better if they have clear and organized presentation of the information. SAP Business One Cloud offers various methods of reporting such as: SAP Crystal Reports, standard reports, SAP Business One Excel Pivot, SAP Business One Query Manager.

H2. The specific requirements of a business organization during the implementation of SAP Business One Studio can be solved through development of Add-on software.

The results that we conducted during the implementation of SAP Business One Cloud at JYSK, suggest to us that whatever software solution we implement, no matter how advanced it is, it must adapt to the clients' requirements and the way of working. As pointed out by Leon (2007), ERP systems serve an important function by integrating separate business functions including: materials management, product planning, sales, distribution, finance and accounting and others-into a single application. The same situation is with SAP Business One Cloud, where during the first phase of discussion with senior management, we noticed (and found it reasonable) that some modules should be modified and adapted to the requirements of JYSK.

The modification of modules based on the requirements of our case study was done through Add-on software, through which we collected the necessary information to answer the second question of the study. Based on the literature that we have reviewed and the references cited as well as based on our results from the development of Add-on software, we have identified some technical requirements that every business organization should pay attention to in order to successfully develop the custom software according to the needs and requirements of the management.

The positive side of SAP Business One Cloud is that it offers the possibility to make changes in the basic modules and to add other functions that are necessary for the performance of daily business affairs, as well as for the preparation of various reports depending on the law of the country where they operate. The development of Add-on Software for SAP Business One is done in two ways, through the SAP Business One Studio platform and through Microsoft Visual Studio. SAP Business One Cloud is based on the .NET framework, C# and SQL Server. SAP Business One and .NET framework offer a big source of sample codes and help about coding the software. Yongming (2005) pointed out that .NET Framework provides a lot of sample code and ready namespaces that make possible automatic code generation, where as a part of his study he has developed a

complete ERP system with entirely auto generated client facade, partially generated Server and Ether tier code and about 11,800 lines of SQL code. Another technical requirement, which is important for implementing and developing Add-on software, is the connection with the server and security of the connection and the system in general. Since the application is installed in the Cloud, it is not necessary to make additional investment in hardware and software to operate and use SAP Business One Cloud. Srinivasan (2013) pointed out that a business organization that uses cloud-based software does not know where the servers are located physically and so providing that form of security is transferred to the service provider. This is one of the reasons that raises the question of liability of a security compromise. The graphical user interface is an important technical factor which influences the experience of the employees. In a study by Dewan and Freimer (2003), they highlight that the interface of the add-on software must be unique and made more consistent and tightly integrated with the base software by providing greater usefulness for the main software user. After the development of Add-on software, in order to import the software to the main framework of SAP Business One, the Add-on software should go through a certification process.

H3. The use of SAP Business One Cloud increases the resource flexibility level in the retail sector.

To clarify the third hypothesis of this study, we relied on data collected from the literature and based on the results of the questionnaire that we conducted with employees or future users of SAP Business One Cloud in the retail business organization JYSK. Based on the results of the questionnaire, the employees of JYSK are satisfied with the functions and performance of SAP Business One. Out of 75 employees that participated in this questionnaire, 78% answered positively and said they strongly agree that the new installed ERP System is more usable and less complex than the previous software. In a study by Xun Liu (2014) about usability analysis of working with SAP applications, he pointed out that the employees at Volvo Group, the case study business organization, stated that SAP applications do help their jobs, because they can personalize any transaction without programming skills. In terms of training and

knowledge about SAP Business One Cloud, 40% of JYSK employees have stated that they need additional training and knowledge about the system. Esteves (2014) concluded that ERP training is a very complex issue which deals with many dimensions and components. Based on the results of his study, he suggests that specific opportunities as well as challenges exist in ERP training management. This is an indicator that shows that the training of employees during the implementation phase has not been done successfully and in order not to have problems in the future with resistance to change, the management of JYSK should organize additional trainings. In a study conducted by Scott (2005) about ERP post-implementation, new software usability and navigation was analyzed and it was concluded that users waste more time trying to correct errors of ERP where they are not satisfied with task support.

One of the factors that makes a software acceptable to users is navigation and customization, according to user requirements. From the questionnaire conducted in JYSK, the employees responded positively about how they can use the software, how they can navigate it and how they can adjust it according to their needs. More precisely, 80% of them think that SAP Business One Cloud is more easily navigable compared to the ERP software they have used before. Based on our case study and adequate literature, we can conclude that in cases when the implementation of ERP is done based on the rules and recommended steps, which include also adequate training for the users, good information system and involvement of high management, the employees accept the change inside the business organization and they use the new software for their daily tasks. A study conducted by Akan et al. (2016) supports our result. They point out that employees in different departments resist change due to some reasons, such as lack of communication, insecurity and fear of change. The resistance to change is present in those cases when the employees or future users of the ERP System, do not have knowledge and information how to use the new system. In this case, they come to a situation where they cannot finish a job with new software, and therefore still use the old ERP software to get the job done and find solutions.

5.2 Conclusions

We live in a time when things are changing every day, especially technology and its implementation in different sectors. As we have seen from the analyzed literature, there is a big advancement in the development of ERP Software. Business organizations invest in new technologically innovative solutions in order to carry out their daily work more quickly and efficiently. One such development is also in the ERP Software sector, which has recently begun to be implemented in the cloud due to better functionality and lower cost of installation and maintenance. Various business organizations migrate from traditional ERP systems to Cloud ERP, which is also the case with JYSK, where the management of this entity decided to replace the old ERP system called ClickKon with a more advanced cloud-based system such as SAP Business One Cloud. JYSK had implemented partial ERP Solution for the stores. They had different software for different departments. These software solutions were not integrated into and were not connected with the main warehouse. Taking in to consideration the fact that the JYSK headquarters as well as the main warehouse are using SAP as an ERP system, it was a good idea that the same system be implemented at all JYSK stores. In this way, the integration of the whole supply chain can be easily realized and can be integrated into the ecommerce web shop. SAP has different ERP integrated packages for retail businesses, where special modules for Point of Sales, Accounting, Customer Relationship Management (CRM) and ecommerce shopping cart are implemented. At JYSK, implementing integrated information systems is a need because of the problems that this company has with the old system. The employees and the management believe that through migrating to better ERP software, they will be able to have better control over all the processes and remain well-organized throughout their daily tasks. The supply chain can be connected with the main warehouse database through which the orders and purchases can be automatically processed.

Based on the current literature of this study as well as based on the results from the research conducted at JYSK about the implementation of SAP Business One Cloud, we can conclude that business organizations in general should pay special attention during

the entire implementation process. SAP Business One Cloud is the best software solution for JYSK because through this ERP system, with a smaller investment than for other software solutions, the business organization can perform all work tasks and can add new modules through Add-on projects or different scripts according to their needs. Add-on can be programmed into different programming languages and imported into the base program. This will greatly facilitate the work of employees in various departments and the management of the business organization will not need to change the work processes and operation processes based on the new ERP system.

Another important field where JYSK and other retail companies should invest is the Point of Sale System, where in corporation with the banks, the management of JYSK should analyze the opportunities about fast touch payments, mobile payment etc. Through the advancement of the methods of payment, JYSK will gain more satisfied customers. With the advent of mobile and ecommerce technologies, the retail sector has become more dynamic and riskier at the same time, which means that if the business organization is not following the last trends of technology and information management will not be competitive in the market in which it operates. When it comes to the opportunities to emerging technologies and trends there are many new technologies that need to be implemented, some of which have been listed below:

Ecommerce web page where customers will have the opportunity to purchase online products as well as have the opportunity to find more information about the products, sale campaigns and other activities that are related to sales and marketing. **Mobile Application** is one of the most known forms of communication today and a good tool for informing the costumers about the information related to products, sale campaigns, company regulations etc. The mobile application can be connected with the ecommerce platform and clients can purchase their product from their mobile phone. **Inventory software solution**, which will help the employees to track the orders, control stock, control assets and identify products in a faster way. In case of implementation of these technologies, it is necessary to change the inventory process, purchasing process and other processes that are directly related to ERP software that is currently in use. The

inventory process can be managed in an easy way by proper hardware for counting the products. Therefore, the company should analyze the idea of investing in inventory hardware system with which it will gain back the investment for a short time because with the new system, the employees will need less time to finish the process.

Another issue that business organizations should consider is document management system. Retail companies have much documentation for different processes and after many working years, the company ends up with an office full of documents. Therefore, through a good document management system, business organizations will have the opportunity to store the whole documentation digitally in a safer place.

Regarding the user experience of the employees, the management of JYSK should develop a plan and inform the employees about every change that is about to happen in the company. The success of the implementation of a change depends on how the management of the company will organize the internal communication as well as on whether the senior management will be part of the project.

5.3 Expected Outcomes

This study can be further developed in different directions, based on the results of the implementation of SAP Business One Cloud and the questionnaire developed and realized with JYSK employees. In particular, the implementation of any other cloud-based ERP software solution can be analyzed based on the plan and results of JYSK.

Another issue that the researcher can investigate is the development of Add-on software, how Add-on software can help meet various business requirements, what are the easy ways to program and develop them, and how programming languages and database applications through which these programs can be developed, compare among themselves.

5.4 Limitations

In every, there is always space for improvement and further development. This study also has room for improvement and has its own limitations that mainly have to do with

further development and advancement of the software and the way of its implementation in a business organization. One of the main limitations is that this study was conducted only at a single business organization and we do not have the information as to what results can be achieved during the implementation and development of Add-ons projects in other business organizations.

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7. APPENDIX 1 - INVITATION TO COOPERATION

To whom it may concern,

My name is Agron Bexheti and I am a post-graduate student in Software and Application Development at the South East European University. As part of my Master's thesis work, I am planning to analyze the implementation of Enterprise Resource Planning (ERP) system and development of Add-On software at your company.

Purpose of the research: This research intends to outline the implementation of cloud-based Enterprise Resource Planning (ERP) software inside the retail business organizations. Specifically, this research will analyze the implementation of SAP Business One Cloud ERP software at Danish retail chain JYSK through programming and developing Add-on Software Projects in SAP Business One Studio, in order to manage and satisfy all the requirements of the users based on the procedures and processes of their daily work. The development of Add-on software for SAP Business One Cloud will be done by SAP B1 Studio, which is an open platform based on the .NET framework.

The study will focus on the company you lead where I believe you will be interested in an analysis of this nature. I would greatly appreciate your help if you are willing to cooperate by allowing a part of the sample of this study to be your company employees. All participants will be anonymous.

Benefits: There is no direct benefit from this participation. However, you may gain indirect knowledge by being more informed about the successful implementation of ERP software at your company and development of Add-On software.

Should you require any further information or clarity on the requested activity, please do not hesitate to contact me on +38972204397 or email me at agron.bexheti@gmail.com.

Yours sincerely,

Agron Bexheti

8. APPENDIX 2 - QUESTIONNAIRE

Instruction: Following are some statements that will help us recognize your attitude. The information you provide will only serve us for scientific purposes. Keep in mind that only honest answers will give us real results. The questionnaire is ANONYMOUS. Participants in this questionnaire should be only employees at the business organization.

This survey will take approximately 5 -10 minutes to complete and your participation in this study is completely voluntary.

Thank you for participating!

| I | Demographic questions |
|---|---|
| I.1 Gender 1. Female 2. Male | I.4 Department 1. Sales 2. Marketing 3. Purchasing 4. Warehouse 5. Finance |
| I.2 Age 1. <30 2. 31-38 3. 39-50 4. 51< | I.5 Education 1. Primary education 2. Secondary/high education 3. University 4. Master/Doctorate |
| I.3 Length of employment 1. <3 2. 4-8 3. 9-15 4. 16< | |

The below items refer to the user experience and opinion regarding the implementation and development of SAP Business One Cloud ERP system at Scandinavian retail chain JYSK. Please rate the following statements by placing an "X" under your answer choice.

Please rate your degree of agreement with the following statements:

1.Strongly Disagree, 2. Disagree, 3. Neutral, 4. Agree, 5. Strongly Agree

| II | User experience | | | | | |
|--------------|---|---|---|---|---|---|
| II.1 | I think that I would like to use this application frequently. | 1 | 2 | 3 | 4 | 5 |
| II.2 | I found this system unnecessarily complex. | 1 | 2 | 3 | 4 | 5 |
| II.3 | I thought this application was easy to use. | 1 | 2 | 3 | 4 | 5 |
| II.4 | I think that I would need assistance to be able to use this system. | 1 | 2 | 3 | 4 | 5 |
| II.5 | I found that various applications in this system were well integrated. | 1 | 2 | 3 | 4 | 5 |
| II.6 | I felt very confident using the application. | 1 | 2 | 3 | 4 | 5 |
| II.7 | I needed to learn many things before I could start using this application. | 1 | 2 | 3 | 4 | 5 |
| II.8 | I think that it is easy for me to navigate and access information. | 1 | 2 | 3 | 4 | 5 |
| II.9 | I think that it is easy for me to understand and comprehend the presentation of output. | 1 | 2 | 3 | 4 | 5 |
| II.10 | I think that the applications support me in my work. | 1 | 2 | 3 | 4 | 5 |
| II.11 | I think that it is easy for me to initiate the applications with intuitive nature. | 1 | 2 | 3 | 4 | 5 |
| II.12 | I think that it is easy for me to customize the interface. | 1 | 2 | 3 | 4 | 5 |