UNIVERSITY OF LJUBLJANA
SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

# SELECTING ERP PACKAGE IN NORTH MACEDONIA AND CROATIA

Ljubljana, September 2021 ANITA STAMENKOVSKA

# AUTHORSHIP STATEMENT

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## LIST OF ABBREVIATIONS

AI - Artificial Intelligence

BI – Business Intelligence

BOM – Bill of Materials

BPEL - Business Process Execution Language

BPMN - Business Process Model and Notation

EPC - Event Driven Process Chain

ERP – Enterprise Resource Planning

IPO - Initial public offering

KPIs – Key Performance Indicators

OCR - optical character recognition

OS – Operation system

P&L – Profit and Loss statement

RBAC - Role Based Access Control

RDMS - Relational database management structure

SQL DB – SQL database

SRP – Service Resource Planning

XBRL - eXtensible Business Reporting Language

# INTRODUCTION

Now days, digital transformation coupled with Enterprise Resource Planning (ERP) software, Business Intelligence (BI), Artificial Intelligence (AI), eXtensible Business Reporting Language (XBRL), business models, digitalization practices seem to be a common topic among business professionals. In this highly automated, IT-led business environment, companies are forced to keep up-to-date with the new technologies to remain competitive (Spathis & Constantinides, 2003). The business sector has come to a point where they would buy off-the-shelf ERP licenses from an unknown provider over the Internet, afterwards change it for a new and different one or continue not using it all (go back to excel sheets). Others are more careful choosing the "right" (matching their business processes) ERP software but afterwards face the need of different external application and invest in bridging this app with the software. Another case is, using an outstanding ERP solution without good reporting capabilities. In this situation, a firm invests a lot of funds for a BI solution that would mean another work position opened, or a department established – just for this aim.

Digital transformation, the impact, the hype and opportunities are intangibles that should not be skipped, but let also consider the operational activities as key role players. Their importance comes at sight when realizing that "digital transformation" with simple operations in (for example) the manufacturing sector (backbone of economy and active exports driver), is a crucial point. In an ERP case of a manufacturer, an excellent digital establishment of material records and work order tracking is a basic must. Moreover, "digitalization" in the service intensive industry means the usage of an SRP (service resource planning) for tracking billable hours of resources (in this term employees), or track KPIs of talent performance metrics (Oracle NetSuite, 2020). In an ERP case of a service provider, an excellent establishment of projects and employee time tracking is a basic must. All other financially related records and complex reports, require a good basis.

Digital transformation is defined as an "organizational strategy formulated and executed by leveraging digital resources to create differential value" (Ismail, Khater, & Zaki, 2018). Therefore, from a business practical perspective, companies adopt ERP systems and leverage their internal resources (educating employees and improving their digital skills), to create a different value for their customers (provide timely, accurate, proactive information, or deliver a product that can delight a user).

As the whole organization is impacted by the established ERP system, its acquisition needs to be carefully reviewed. This activity is considered to be high-expenditure, bearing high level of risk and uncertainty (Verville, Bernadas, & Halingten, 2005). Additionally, Jacques Verville argues that:

- When a wrong purchase is made, it can jeopardize even the existence of the firm – the cause is:

    - Employees feel devastated of running in circles with no clear instructions
    - Wrong decisions are being made due to poor analytics
    - Loss of partners and suppliers (due to unmet deadlines)

- Because of the implementation uncertainty and risk related, ERP implementations are said to be the single business initiative most likely to go wrong (Verville, 2002).

An ERP system is a complex suite of software modules that are composed of thousands of tables that require sophisticated knowledge to configure and install (Alvarez, 2008). It is no wonder that organizations of all types and sizes that are installing ERP systems are incurring implementation costs five times the cost of the actual software license (Scheer and Habermann, 2000), with an average time of installation of approximately twenty months (Metagroup, 2003) (Alvarez, 2008). Even more, Themistocleous *et al*. (2001) report that 38 percent of companies do not replace their legacy systems when adopting ERP systems (Themistocleous & Irani, 2001), despite the big cost and time already invested.

ERP systems have become one of the largest IT investments (Chung & Snyder, 2000). The variety of packages available nowadays makes the decision process complex and long. Conjoining functional areas and business processes in an integrated environment for the only purpose of providing a broad scope of applicability for organizations, causes even bigger problem for choosing the most suitable option (not excluding the viable alternative to in-house development). Moreover, there are a few curtail barriers companies face when selecting an ERP solution. Including: execution challenges as insufficient digital skills, change and acceptance mindset, lack of vision, regulatory changes (Fitzgerald, Kruschwitz, Bonnet, & Welch, 2014). Organizational change is one of the most important barriers encountered in transition of new systems and business processes (Kumar et al., 2003) and is an important reason for the failures (Saatcıoglu, 2008). Additionally, it seems to be a heavy task finding the right solution because of the broad choice solution providers offer.

The magnitude of ERP's managerial implications has resulted in many publications on why companies are motivated to purchase an ERP system and which problems can occur during implementations (McAdam and Galloway, 2005). These include many reports about disappointing results of ERP system implementation and performance (Ho et al., 2004; Howcroft et al., 2004; Trimi et al., 2005) (Elbertsen, Benders, & Nijssen, 2006). Additionally, the available scientific research published does not provide a clear roadmap companies should consider when selecting an ERP solution. Significant number of published literatures covers business processes and the digitalization approach in general. There is lack of research on how

a company can identify the correct ERP solution or rethink internal business processes. Therefore, my motivation for research is to work on a roadmap that clearly pictures steps a company needs to follow when identifying the correct ERP solution, covering case scenarios of different industries on local and international markets (North Macedonia and Croatia).

The primary purpose of this master thesis is to review the ERP selection process of local and international companies and additionally, work on a wider perspective that outlines a more comprehensive approach for treating the ERP selection process, when the following ERP providers are considered as a choice: SAP, Pantheon, Oracle NetSuite, Diglas ERP and Microsoft Dynamics. I have chosen these ERP vendors as they make a perfect mix of local (Diglas ERP and Pantheon) and worldwide (Oracle NetSuite, Microsoft Dynamics and SAP) ERP software usage. Moreover, I have worked closely on full and partial implementations for the companies whose cases are discussed in this study. Ultimately, the purpose is to have this Master Thesis contribute to better understanding of the market offerings in order to better approach the ERP selection process. A critical literature review of primary and secondary sources is present, including books, scientific articles and journals from different authors. Primary data is collected by conducted semi-structured interviews of personnel responsible for digital transformation from four different industries (IT, Manufacturing, Biotechnology, Retail and Wholesale). The interviews consisted of open questions about internal business process and technical approach of how these firms are processing documents, exporting reports, master data management.

The research objective is broken down into the following goals:

- describe and analyze the offered solutions of five different ERP solutions in terms of functionalities and modules
- describe the business processes of companies using these solutions
- summarize the analysis by comparing abovementioned ERP types and gain more practical knowledge whether a local firm should use a localized solution or could also choose an international one

Accordingly, the research question of this thesis is “Should local firms in Macedonia and Croatia use a local ERP provider or aim towards an international solution?”.

The structure of the master thesis is as follows: In the second part, a brief overview of different deployments of ERP solutions, giving an accent on the importance of business processes as an underlying metric for good ERP selection. Afterwards, there is a short general explanation of the following ERP vendors: Oracle NetSuite, Microsoft Navision, Diglas ERP, Pantheon and SAP. Then, by approaching the business process there is a continuance of an analysis of available modules and business logic of the five listed ERP solutions. In the third part, based on

the conducted interviews, a map of internal business processes is listed, coupled with summary points of why that firm decided to select the ERP solution. The fourth chapter follows an evaluation of the acquisition process with ERP selecting guidelines. Lastly, a conclusion is present holding limitations of the study with further research proposal.

# 1 ERP SOFTWARE

Before diving in ERP software basics, let's shortly review the differences between international operating companies and locally oriented. Companies that have international footprint tend to be more complex. Their internal business process can be easily compared to locally operating business, with an important difference – the international footprint. Internationally present companies operate through separate subsidiaries, facing different tax jurisdictions, different tax reporting requirements, multi-currency challenges, intercompany transactions, transfer prices, multiple warehouses, report consolidations, complex budget structure. On the other hand, locally owned businesses enjoy a comfort zone within known ground. Since middle and small market companies have different needs, infrastructure and resources from the Fortune 1000, ERP software is being made on several more management fronts, from costs to start-up time required (Yun Zeng, 2003).

When their business process and requirements are technically translated into software, a complex structure of an Enterprise Resource Planning (ERP) solution is present. ERP systems usually include a set of mature business applications and tools for financial and cost accounting, sales and distribution, management of materials, human resources, production planning and computer integrated manufacturing, supply chain, and customer information (Žabjek, Kovačič, & Štemberger, 2009). Enterprise Resource Planning (ERP) systems such as SAP, PeopleSoft and Customer Relationship Management (CRM) systems such as Salesforce, NetSuite and Microsoft Dynamics started in early 1990s and had a second coming in early 2000s (Agrawal, 2014). These systems organize enterprise-wide information into databases, which are accessible, quarriable and analyzable (Agrawal, 2014). The design is usually around a defined data schema within a common database. This ensures that data information flow across the whole company is within a single definition (NetSuite, 2021). The data is interconnected with business process logic driven by defined workflows, connecting departments and users within an organization. Lastly, the aim to have one source of truth when it comes to information and data validation.

There are many reasons why should a company consider implementing an ERP system inside its ecosystem, but the most prominent ones are (Kanya, 2021):

- To gain competitive advantage and
- To reach operational excellence

Competitive advantage means to strengthen the brand loyalty, to be proactive, predict customer behavior based on historical data and patterns, be different, be fast (Gordon, 2021). On the other hand, operational excellence means that the final product/service can be produced/delivered at the lowest possible cost. Moreover, it means that the firm can be a place where teamwork and problem-solving issues are on top of the list, due to employee empowerment and positive attitude. This only leads to higher customer satisfaction.

When approaching the selection criteria theoretically, the way how ERPs are selected is based on several principles (Link & Back, 2015):

- Economic principle – the focus is on efficient coordination and management of enterprises and stakeholders. The coordination is efficient if the final product/service is produced/provided at lowest cost.
- Social principle – is related to user's behavior as an explanatory factor in adopting innovations. In order to adopt an innovation, the innovation component needs to have market advantage and compatibility.
- Strategic principle – tightly related to the resource-based view and the outsourcing theory in a narrow sense. With the resource-based view, optimal resource allocation is considered. Efficient and effective use of resources means using resources that are valuable and rare, otherwise no sustainable competitive advantage is reached and high costs are involved. In terms of ERPs adoption, IT resources should be as cost-effective as possible, which can be achieved by outsourcing, or if not, they should provide competitive advantage. The outsourcing strategy has three differentiators: why the firm should outsource, what should be outsourced and how to outsource.

Accordingly, there are different kind of companies, operating on different markets, having different requirements. For example, an internationally present company requires language support, accountancy localization, intercompany functionality, online access. Accordingly, there are different systems that can cater this requirements variety. The first step towards the selection approach is the deployment. The main key question for a company selecting an ERP software is: whether they require full control of their data, or they do not mind holding internal data and transactions on a hosted server? The section below elaborates key differences, with later focus on operation modes.

## 1.1 On premise vs cloud

When approaching the decision of selecting an ERP solution for a specific business operation, it is very important to understand the fundamental deployment. Deployment means whether the ERP is established on-premise (resources are deployed in-house and within enterprise's IT

infrastructure) or the ERP is cloud based (on-demand service), where all resources are hosted on the premises of the service provider and enterprise is able to access those resources and use as much as they want at any given time (Hughes, 2021).

In global competitive conditions ERP has risen in strategic significance and choosing the right ERP package has been more important (Baki & Çakar, 2005). This decision is considered to be important just because ERP systems are of extremely high-strategic relevance for the firm, involve significant investment i.e., involve high implementation costs, also are burdened with long implementation period and must fit the operational processes. If considering the big picture, base criteria for selecting each of the both deployments are (Hughes, 2021):

- SaaS ERP – is selected when there is a lack of IT capable resources and a high need of flexibility is present. When pointing flexibility, it is meant that the firms' business model is one that is in high and fast development, operations can be expanded increasingly fast or they are seasonal.
- On-premise ERPs – should be selected when firms' IT resources are of high capacity, specific or strategic resources can be outsourced or when a major customization/development is of fundamental need. Even more, on-premise ERPs are selected when the company wants to own (have full control over) their ERP data.

In order to understand the crucial differences between a cloud and an on-premise ERP solution, the same can be expressed with a simple metaphor (in words of a technical staff of the sales division in SAP) "One can go his own way, a taxi ride, where the customer decides where he wants to be picked up and where he wants to exit – this is a little bit more expensive. Otherwise, he takes the city bus, where the entrance and exit are predefined" (Link & Back, 2015).

## 1.2 Systematic differentiations between SaaS and On-premise ERPs

The selection of ERP, based on the deployment is dependent on multiple factors. These factors need to be carefully considered when taking the deployment decision. This decision later on has big impact on: accessibility, employee onboarding, maintenance, infrastructure costs. The section below, describes the systematic differences and pictures the advantages and disadvantages of both.

Main systematic differentiations between SaaS and On-premise ERPs (Link & Back, 2015).

### 1.2.1 ERP adoption costs (total cost of ownership)

- Pricing – when it comes to pricing, the business model is the most active differentiator. A SaaS system is commonly rented on a monthly basis, subscription fees cover all services of access and maintenance. Costs are shared with other customers. On the other hand, on-premise ERP system license should be purchased (full amount is paid upfront). This purchased license does not cover installation, maintenance and update. All costs are on the customer's profit and loss statement.
- Liquidity – having the ERP system as a service, and not as a product replaces non-recuring with recuring costs and lowers initial costs. From an accounting point of view, entry costs are lower and rent is off-balance, whereas licenses can be capitalized.
- Cost differences – with SaaS, the charge is based on variables (based on number of users, storage, number of transactions, modules, etc.) but transparent monthly subscription fee. On-premise involves: purchase of one-time license fee (which upon time is depreciated), annual maintenance fees (ranges between 15-25% of license fee) and service fee (installation of updates), operating costs (hardware, software, OS, firewall etc.) and operation, hardware and software maintenance, updates.

Software as a service (SaaS) applications are cloud-based applications that are accessed over the internet and are managed by the vendors who charge a "pay-as-you-go" subscription fee, whereas "on-premise" applications require the organization to install a version of the software locally, by obtaining a software license (R., K.R., & Nargundkar, 2020). As no installation is needed, SaaS ERP requires no IT knowledge, only a laptop and internet connection are needed for a prime kick-off. When this is a case, company's core resources can be focused on core operations rather than taking care of infrastructure, maintenance, updates.

In order to keep up with internal management requirements, law and regulative change, system updates are of a mandatory requirement. The SaaS provider is responsible for delivering, securing and managing the application, data and underlying infrastructure (R., K.R., & Nargundkar, 2020). This allows to have latest technologies and functionalities instantly

available. This kind of incremental update on an on-premise ERP is highly costly (each instance needs to be updated). Cloud ERP can be challenging when expanded to multiple departments in large organizations or expanding to new geographies or new business lines (Gupta, Misra, Singh, Kumar, & Kumar, 2017). It can be more difficult for cloud ERP to keep up to these changes and to have flexibility to allow the software to adjust to the changes made in real-time basis (Solutions, 2013). In practice, this statement is not true, especially with the use of NetSuite. The details can be reviewed in the later section Oracle NetSuite overview.

Back up and security, are essentials in ERP systems. With SaaS, the backup is part of the service while at on-premise solutions, the customer is responsible for. When considering the economies of scale, a professional SaaS provider can provide a higher backup standard and up-to date system, than a backup standard an internal IT system can establish.

### 1.2.2 Initiation and implementation

Below is a short table that summarizes challenges of the implementation and initiation process:

*Table 1: Variables of the implementation process nr. 1*

| ***Variables*** | ***SaaS*** | ***On-premise*** |
|---|---|---|
| *Trialability* | Can be tested immediately using a demo | The final decision is often made in a preliminary project |
| *Time* | As no hardware is needed, can be implemented faster | Infrastructure is needed, so implementation last longer |
| *Reconfigurations* | Functionalities are parameterized and preconfigured, only slightly customization is needed | Functionalities are parameterized and preconfigured, and customizations can be challenging |
| *Migrations* | Same effort is needed | |
| *Training (dependent on the training concept)* | Self-training is easily provided with learning center access via web videos and learning lessons | Traditional individual and group contact training lessons predominate |

*Source: Link & Back (2015).*

### 1.2.3 Flexibility and changeability

When it comes to flexibility, the SaaS EPRs have more advantages than the on-premise ones. This high flexibility is due to resource variability, meaning that multiple new functionalities and modules can be added just by subscribing to new models or application providers. It is possible to start with a small package, and later on upgrade to a bigger one. It is possible to start just with few users, and easily add on multiple in later stages (users are usually not required in On-Premise systems). The customer has an infinite pool of scalable resources and the price and requirements can easily be adjusted within internal economic situation, correspondingly.

Moreover, SaaS modules can be selected individually, or with a bundle, according to needs. These modules can be added and changed only withing few minutes, by installing or uninstalling. At the On-premise solutions, is almost impossible to remove modules, and costly to add new ones. Nevertheless, the removal of modules is not problem-free at the SaaS versions, as well. The history data is a problem. It needs to be migrated to an Excel or another tool.

Additionally, the system accessibility is much more convenient as at the SaaS versions, this form of access is location and device independent. While, VPNs and client software are a must when connecting to an On-premise solution.

There are, however, constraints in the design possibilities while major modifications are complex and extremely costly. The implementation delays and ERP product modifications could result in exponential growth in both direct and indirect costs (Štemberger, Jaklic, & Bosilj-Vuksić, 2006).

### 1.2.4 Configuration and customization

Constant change of tax regulation, financial institutional needs, frequent management turnover, need of different reporting needs, require a company to consider the customization point.

From effective perception, internal business process that are of strategic importance, should never be outsourced. Being outsourced might bring the problem of being copied, lost or taken over by competitors. Outsourced should be only tasks and activities that are repetitive and easily grasped.

From efficient point of view, configuration and customization are very important when the business needs are not in line with the SaaS offered. There is no issue with the On-Premise solution, as the same can be built according preference, but in most of the time this built from scratch or semi built, is extremely costly.

On the other hand, SaaS solutions are often altered by local partners correspondingly, building a specific localization (module that is extremely compatible to local tax and finance requirements and very often translated to local language), that is only an enhanced version, of the core system.

### 1.2.5 Security

Today, practically there is no firm running offline. As being online present the whole time, each firm is fully exposed to data theft. According to a Sales Manager in SAP, data theft is most common to occur in-house, by employees. This problem often is tackled by restrictive access.

On-premise solutions often are considered to be safer as most of their network is established inside the organization, disconnected from the Internet. The data ownership is almost a 100% in the hands of the user. If the system crashed, all data is still recoverable. On the other hand, resources for network security will most likely be way more limited than what a big SaaS provider can bring to the table.

When considering a SaaS solution, the user has no control of the data and the application in general. No control over the performance, backup, nor the storage is present. A professional provider will always enhance the know-how by detailed papers and security information. The brand name is often the first introductory assurance of a high reliable security center. SAP and Oracle holding the top of the list. Moreover, needed certificates, safety standards as SSL encryptions, 2FA (2 factor authentications) and high-tech data centers are the common risk takers. The most known security accreditations for SaaS providers are (Sporn, 2021):

- ISO 27001 (gold standard that proves that there is a well-established Information Management Security, fully capable to manage related risk)
- SOC 2 (widely accepted security/audit framework bult up on five principles - Security, Availability, Processing Integrity, Confidentiality, Privacy)
- OWASP ASVS - Application Security Verification Standard framework for testing and hardening web application tech security
- CSA STAR – consists of three levels of assurance: Self-assessment, a rigorous, third-party assessment and continuous monitoring program (still under development)
- ISO 22301 – based on “plan, establish, implement, operate, monitor, review, maintain and improve infrastructure to protect against, reduce the likelihood of occurrence, prepare for, respond to, and recover from disruptive incidents when they arise.”

### 1.2.6 Characteristics and dependencies of the operations modes

Regarding the operation, SaaS are fully dependent of internet connection speed and its performance. Especially when a customer needs to use the ERP as a content management system (upload time can be a real problem). There is some on-premise software that can be accessed over the web, but full clients are often faster than web clients.

Moreover, the SaaS user is completely dependent on the provider service. Once the Provider decided to discontinue the service, all users need to export their data to a SQL DB (SQL database) or excel sheets. On the other hand, On-premise solutions can still exist, and this situation is completely out of their concern.

Due the fact that SaaS solutions are in general available for wide range of users, their functionalities are standard and the probability of error is much on a lower level then the on-premise. This also brings us to the point that because of standardization, industry specific modules and specialized functionalities may not be in the offer. This is also related to the fact the SaaS solutions are younger than the on-premise.

As a conclusion, even if the SaaS is not OS (operation system) dependent, when a company decides to bring its own operations in an ERP completely, there will be always a dependent characteristic to some extent. The main difference is when a down time is faced, SaaS solutions providers (have immediate access) can react faster than in-house personnel (they need to be contacted).

## 1.3 The importance of business processes as an underlying metric for good ERP selection

When a company has come to a decision of the ERP deployment, the next topics to be considered, are the internal business process. Business process management is a top-down set of organizational principles and methods designed to organize, manage and measure the organization based on its core business processes (Manfreda, Kovacic, Indihar Štemberger, & Trkman, 2014). A focus on business processes is still worth considering for several reasons: it helps us to see organizations from a holistic and dynamic perspective, it encourages organizations to focus on customers and it reveals the need for flexible and responsive delivery mechanisms so as to meet the changing customers' needs (Popovic, Indihar Štemberger, & Jaklic, 2006). The main goal of every BPM project is to enhance a company's performance by adopting a process view of the organization (Skrinjar, Bosilj-Vuksic, & Indihar Štemberger, 2010).

Additionally, the success of an ERP implementation project is top management's perception of BPM. It is a crucial elements in ERP implementation (Žabjek, Kovačič, & Štemberger, 2009). A special emphasis has to be given on business process modeling, because the key to a successful choice, implementation and usage of an ERP system is fit of planned processes in an organization with processes implemented in the solution (Žabjek, Kovačič, & Štemberger, 2009).

In order to implement an ERP successfully, the whole company should treat the project as a change management project. And just because many different stakeholders and actors are involved, each side needs to be taken into consideration. As with any information system (IS), user perceptions about an ERP system play an important role in its usage and eventual success (Saeed & Abdinnour, 2015). Here we come to the point, that bridging the gap between the company requirements and the business needs is of an extremely important topic.

The early stage of selecting an ERP begins with discovering the purpose, goal, scope of the processes that are affected and associated stakeholders. According to Grewal, the buying processes is described as multiphase, multi-person, multi-departmental and multi-objective process and is normally a very long complex and objective process (Grewal, 2015). Just because multiple stakeholders are involved, a requirement analysis for adopting the ERP solution is of a crucial point.

In order to effectively link the business requirements with IT functionalities, the business process modeling, needs to take into account three different views (Panayiotou, 2015):

- business process view (core view) – the modeling can be accomplished through function trees and workflow diagrams
- organizational view – the modeling can be accomplished through organizational charts
- IS view – the modeling can be accomplished with IS mapping and a list of required functionalities

The company requirements are tackled through requirements engineering, by performing a detailed analysis of the functionalities of the new system that is about to be selected. The requirements analysis seems to be an exhausting process just because different stakeholders might have different requirements and on top of this, the miscoordination between company departments results to be a serious problem in ERP implementations. There are multiple requirements analysis methods that have been developed – goal-based analysis, scenario-based analysis, use-case driven analysis, maturity-driven method etc. (Panayiotou, 2015).

A good internal requirements analysis is the backbone of a successful ERP implementation. The most common problems of an ERP implementation are (Panayiotou, 2015):

- Misfit between the company requirements and the system functionalities
- Misunderstanding of the functional requirements by the implementor

In order to avoid the case scenario of having a failure project, vendors and consulting partners use standard frameworks for clearly identifying requirements. The matching of ERP functionalities with the business process of a company can be described by two different approaches (Al-Sabri, Al-Mashari, & Chikh, 2018):

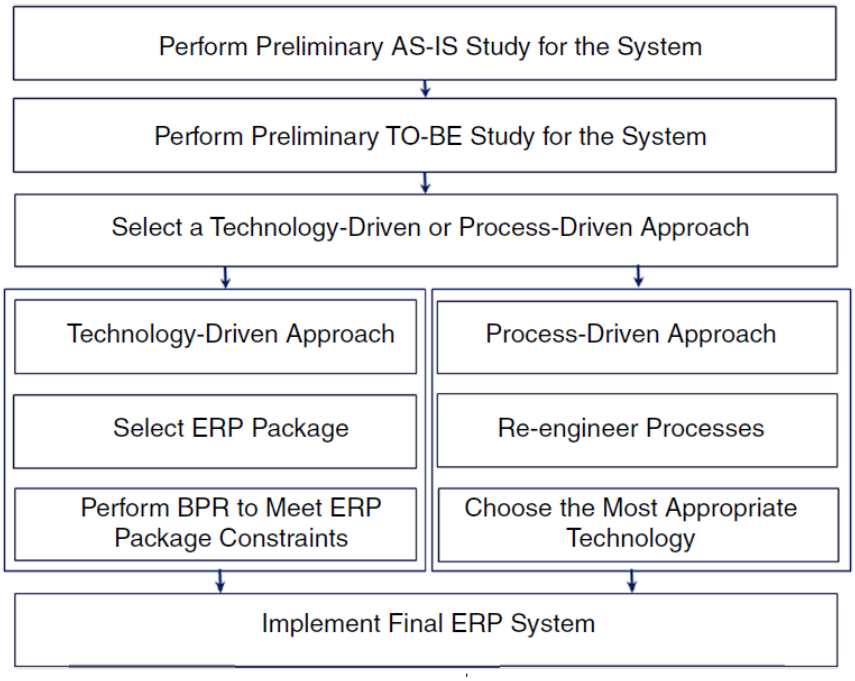
- Technology-driven approach,
- Process-driven approach and
- Hybrid approach

Technology driven approach understands the ERP adoption where the company business processes are aligned to the ERP functionality. Most ERP vendors have their own packages named as “best practices” that is actually a framework of predefined functionalities. These built on functionalities are usually a repository of ideal reference models based on extensive research, intensive adaptability and experience gained from previous implementations, that later can be easily reused in an industry that is of the same nature. At this point, the customization and parametrization of the generic ERP functionalities are on very low level and the business processes are reorganized in a way that the information technology has the highest possible effect (the business operation is conducted as assumed by the ERP package).

On the other hand, there are companies that perform business processes which are the core of the business as a whole and have a direct impact of the competitive advantage acquired. At that particular point, companies are not willing to redesign their way of operation to the ERP process flow, but require customization and process adjustments to accomplish a perfect match.

The hybrid approach is the least accepted and developed by structured methodologies and frameworks. Nevertheless, the same incorporates the idea that a company can benefit from both approaches. Below is a figure that explains the typical steps in the development cycle of ERP systems.

*Figure 1: Typical steps in the development cycle of ERP systems nr. 1*



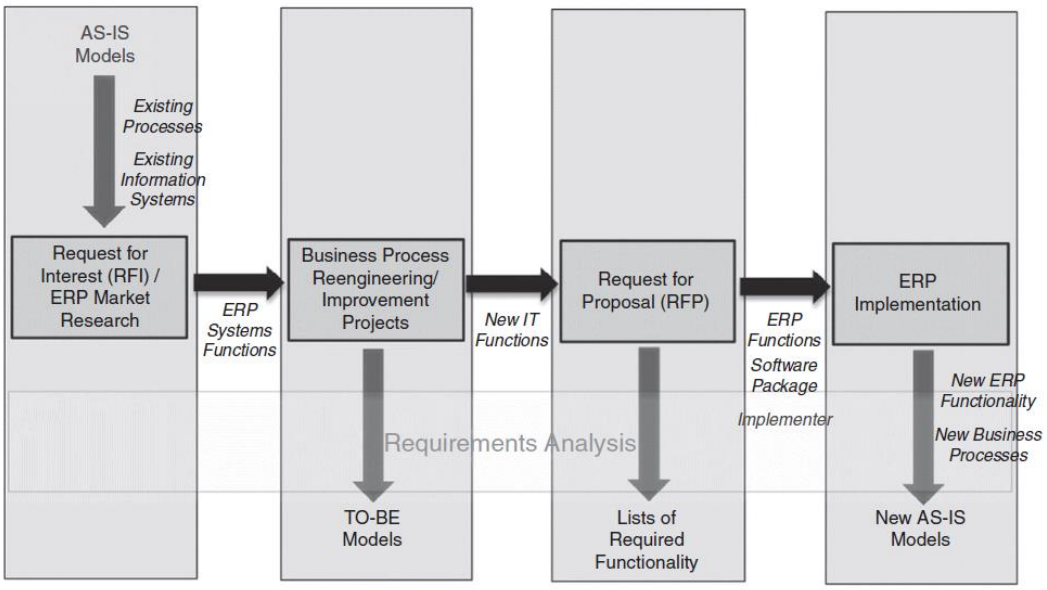

*Source: Panayiotou (2015).*

In order to accomplish a successful implementation, business processes need to be reviewed and modeled in prior. One of the most important criteria is matching between business needs and system capabilities. A comparison is possible because business needs are expressed in the form of TO-BE models, which are compared with the reference models of an ERP system (Štemberger, Bosilj-Vuksic, & Kovacic, 2009). This way, any problematic areas can be tackled and moreover, the problem of functionalities identification can be set-off. In addition, it is even recommended that any business process improvements are done, even before the implementation is started. In the routine phase of the ERP lifecycle, ERP systems may be implemented successfully from a technical perspective, but full success depends on ERP users being willing to use the delivered system (Sternad, Gradisar, & Bobek, 2011).

The business process modeling can help the implementation team understand the requirements (AS-IS models that need to be developed even before searching for suitable ERP packages) and better predict the possible solutions (TO-BE models, a list of new functionalities match with required). The business process modeling can be handled by multiple modeling techniques, which include flow charts, data flow diagrams, role activity diagrams, Gantt chart, workflow techniques and different kind of grids (Panayiotou, 2015). Recently, a very popular technique is the Business Process Modeling Notation (BPMN), Business Process Execution Language (BPEL), Event Driven Process Chain (EPC), Role Based Access Control (RBAC) models

(Panayiotou, 2015). The roots of these models come from variety of system analysis and design, databases design where different notations and business process modeling is done by taking into account different organizational perspectives. The point of the business process modeling is the decomposition to multiple sub-processes. A high-level overview of the process is pictured in the figure below.

*Figure 2: The applied framework for requirements engineering in ERP systems development lifecycle nr. 2*




*Source: Panayiotou (2015).*

## 1.4 Prominent ERP vendors in Croatia and North Macedonia

The popularity of ERP is attributed to its ability to improve the profitability potential of an organization by reducing the time and costs of completing business activities (Mehrjerdi, 2010). Via ERP systems, workflows and accruals can be traced in real time, incompatibilities among employees and departments resulting from the lack of communication can be eliminated and some limitations can be built to human errors through modules such as purchasing, sales, planning and accounting (Börekçi & Kiriş, 2020). In order to better understand the ERP selection criteria and decision of the companies, let us shortly review the most prominent ERP vendors, present on in Croatia and North Macedonia. The companies using a local ERP solution are local and small companies, and the ones that are using an international one, have an international footprint (the company's headquarters insisted on the implementation of the same ERP solution). The section below holds a short overview of the following ERP vendors:

- Oracle NetSuite
- Microsoft Dynamics
- Pantheon
- SAP
- Diglas ERP

### 1.4.1 Oracle NetSuite, overview

NetSuite as an American ERP solution is considered to be the first cloud computing company in the world (seeded only a month before Salesforce.com). Pioneering the cloud computing engineering, NetSuite as a startup was positioned as web-hosting accounting software named NetLedger, supported with the funds of Oracles staff, mainly the founder and CEO Larry Ellison. Accompanied with an outstanding team and their dedication to the internet-based services, they pioneered the SaaS technology as a form of business management. Established in 1998.

Being the first world company delivering business applications over the Internet, NetSuite quickly went public in 2007 after its initial public offering of 6.2 million shares (Miller, 2007) and later in 2016 Oracle Corporation offered $9.3 billion for the purchase of NetSuite. After this official acquirement, NetSuite changes to officially Oracle NetSuite. From this moment, Oracle NetSuite starts relying to the database software licensed from Oracle.

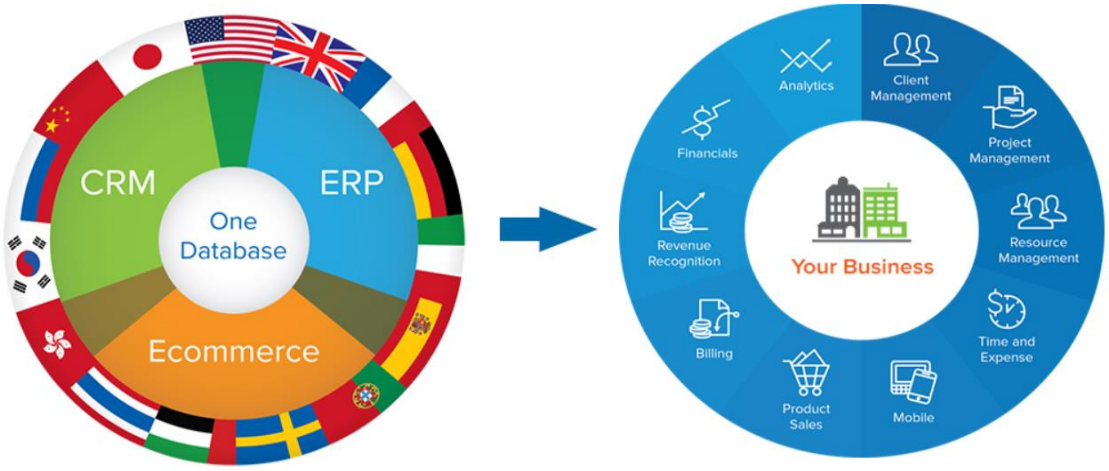
Designed for a modern company, Oracle NetSuite provides a suite of cloud-based Enterprise Resource Planning and omnichannel software, run by +40.000 customer worldwide. Their offices are spread on the five continents (North America, South America, Europe, Asia and Australia).

As an ERP system, NetSuite runs on Oracle NetSuite's cloud platform, allowing companies to access the solution over the Internet. Just an internet connection, username and password are needed. The ERP solution automates essential functionalities providing a single source of data.

The solution as a product is divided into the following categories: ERP, Accounting Software, Global Business Management, CRM, Human Capital Management, Professional Services Automation, Omnichannel Commerce, Analytics, Experience, Suite Success and Planform. NetSuite success is achieved due the extensive and strong partner program spread all around the world.

NetSuite meets business requirements of different size of companies, ranging from small size, midsize to enterprises. Scale-up, spin-off or acquire new international businesses, NetSuite supports any stage of growth. This scalability is due the database built-in flexibility, which is presented in the figure below.

*Figure 3: Integrated business management system nr. 3*




*Source: Oracle NetSuite (2020).*

Managers have always used information to perform their tasks, but the novel thing here is the ability to obtain accurate and real information easily (Štemberger & Jaklič, 2000). Incorporating all the functionalities required to run a business, NetSuite ensures that a complete solution is provided to the end user, all based on best practices. KPI's, dashboards, roles, workflows, forms, integrations and built for NetSuite Applications, are just few of the tools that can easily bridge localization gaps, audits, foreign exchange volatility and give the user real-time visual overview, thanking the pre-built BI dashboards.

At the core of the system is the single database, which represents a core NetSuite competence, offering a OneWorld license (a complex license addressing multinational and multi-company

needs), allowing data-driven and innovative users to improve operational efficiency by delivering real-time visibility and consolidation for specific corporate and subsidiary needs (NetSuite, 2021). Multi-language, multi-currency, multi-country tax compliance and multi subsidiary management are the features that differentiate NetSuite from other ERP solutions.

The following modules run on NetSuite SuiteCloud platform (Beaver, 2020).

- Financials and accounting
- Human capital management (HCM) and/or Human resource management software (HRMS)
- Customer relationship management (CRM)
- Inventory management
- Order management
- Procurement
- Supply chain management
- Project management
- Material requirements planning (MRP)

All the above-mentioned modules can be structured and presented with the help of the figure below.

*Figure 4: NetSuite Cloud Platform nr. 4*


*Source: Oracle NetSuite (2020).*

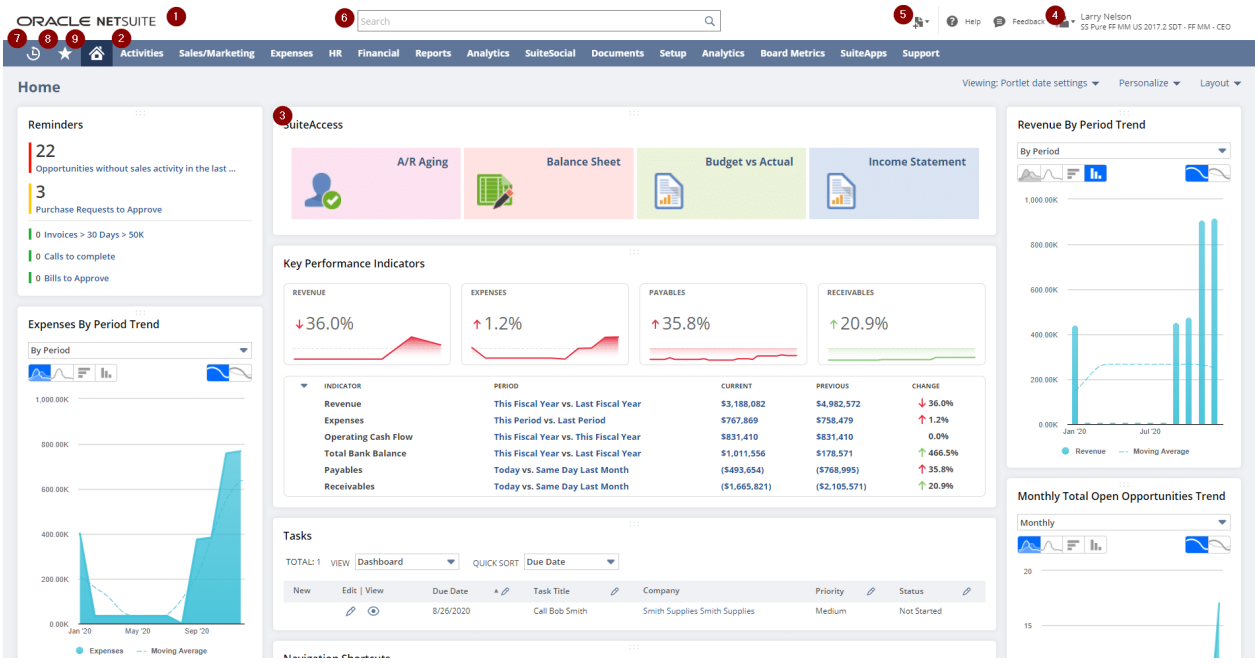
In order to extend NetSuite's' power, better meet localization and specific demands NetSuite also certifies and supports SuiteApps which are applications, built on NetSuite platform, hosted

on the same server and stored on the same database. These applications are meeting the niche specific requirements of users as: manufacturing, non-profit, e-commerce and similar. They do not come as out-of-the-box solution, but a separate purchase is required. The SuiteApps are created by local partners who are part of the SuiteCloud Developer Network (SDN). In order to be part of the SDN, partners are meant to meet certain requirement, and afterwards they are provided with end-to-end comprehensive technical tools.

Also, because NetSuite solutions can be customized for each unique company, it comes with built-in flexibility, incorporating financial and rich ERP features.

NetSuite takes the user interface very seriously. User interface for ERP products is always aligned to the standards recommended by the operating system vendors (Rao, 2000). Each role can create its own interface and personalize it as per the needs. The ERPs rich feature, allows for the use of multiple portlets, reminders, KPIs, dashboards, reports snapshots and trend graphs. These incorporated features come out-of-the-box and represent a real time indication of the most important metrics, designed for each role. Below is a figure of Oracle NetSuite's dynamic interface.

*Figure 5: Oracle NetSuite main interface nr. 5*




*Source: Oracle NetSuite (2020).*

NetSuite service is originally multi-tenant and all servers, storage and hard drives are built on several layers of redundancy. The system data center is spread on two continents – USA and

Europe. The data centers operate in hub and spoke architecture. Each data center has a counterpart that takes care of the redundancy (the design of multiple layers of redundancy, allow for a service that is never interrupted), disaster recovery (within each data center, data is replicated and synchronized) and scalability (supporting over 1.5 billion application requests per day and more than 6 petabytes of data).

The exchange of user credentials and all data in the resultant connection, are encrypted with industry standard protocol and cipher suite. NetSuite uses token-based application authentication and multi-factor end-user authentication. Each user that has access to the system, is assigned a specific role (standard or custom) that is specifically designed to his/her job position, accessing restricted range of data. Each transaction is tracked by a complete audit trail and timestamp.

IP address restrictions are also present, allowing users to create application access restriction even from specific computers or locations. These restrictions are altered by robust cryptographical policies that are complex enough, making a combination of numbers, letters and characters. A higher control of access is also accomplished through a multi- factor authentication option as SMS, one-time passwords (OTP) and backup codes.

To protect malicious traffic, NetSuite has network and server-based Intrusion Detection Systems (IDS) to track any alerts and logs.

The security certifications that NetSuite employs are:

- SOC 1 Type II
- SOC 2 Type II
- PCI DSS (Payment Card Industry Data Security Standard)
- EU-US Privacy Shield
- ISO 27001

NetSuite applications run on a three-tier architecture supporting multi-data center deployment. A status page is publicly available and a (SLC) service level commitment guarantees 99.7% uptime for the application access.

### 1.4.2 Microsoft Dynamics, overview

Microsoft Dynamis as a suite was not originally created by Microsoft. The first work done on the product was in 1980. This package that later on became famous and spread around the world, was actually created by TLB, Inc (Wright, 2021). TBL, Inc was later renamed to Solomon Software which in the 80s and 90s was a leader developer of accounting software (Wright, A

brief history of Microsoft Dynamics, 2021). In 1991 Solomon developed its next generation software line written in Microsoft Visual Basic only for Windows computers and due the multiple awards, recognitions of the public, the firm was acquired by Great Plains Software and afterwards by Microsoft Corporation in 2001 (Wright, 2021).

This acquisition was the initial founding team of the Business Solution division within Microsoft. At that time, Microsoft continued with the development of the new versions under the Microsoft Umbrella, adding role-based interfaces, SQL reporting and SharePoint and Office integrations. In 2006 Microsoft Business Solutions became Microsoft Dynamics. In the next years, the versions of Dynamics were split to: Dynamics NAV, Dynamics GP, and Dynamics AX.

Microsoft now days are based in the USA holding subsidiaries all around the world. As of 31.12.2020 the have 175,508 employees and over 2,000,000 users worldwide (Microsoft, 2021). Below is a figure that comprises the family of Microsoft Dynamics.

*Figure 6: Microsoft Dynamics Family nr. 6*

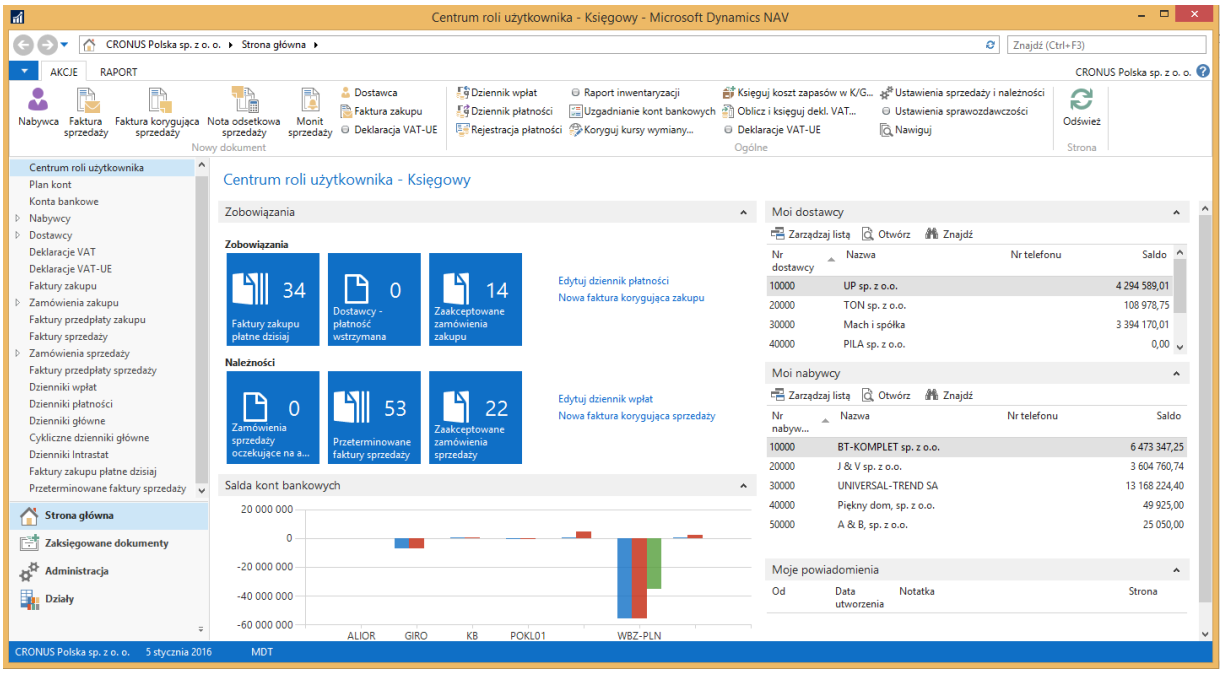

*Source: Artis (2017).*

Microsoft Dynamics NAV as an ERP solution is a part of the Microsoft Dynamics umbrella, assisting SMEs and medium-size companies with finance, manufacturing, customer relationship management, supply chains and analytics. Now days, Microsoft Dynamics NAV still works independently on clients' premises, but it is being replaced by Microsoft Dynamics 365 Business Central. The only difference between these two systems is the deployment. Dynamics 365 is exclusively a SaaS solution and Dynamics NAV needs to be installed locally.

The main modules of Dynamics NAV are financial management, supply chain management, manufacturing, distribution, customer relationship management, sales and marketing, service

management, human resource management, project & resource management, warehouse management. Below is a figure of Microsoft Navision's interface.

*Figure 7: Microsoft Navision main interface nr. 7*




*Source: Microsoft (2021).*

Moreover, the features incorporating Microsoft Navision's platform, can be summarized in 6 main categories as presented below.

*Figure 8: Microsoft Navision main features nr. 8*

*Source: Microsoft (2021).*

Three tires make up Microsoft Navision architecture. To have Microsoft Navision fully running, all three components need to be installed on client premises:

- Client tire - Microsoft Dynamics NAV Windows client + Microsoft Dynamics NAV Web client
- Server tier - Microsoft Dynamics NAV Server
- Data tier - SQL Server

The common configurations are:

- All components are installed on the same computer
- Client and server tier are installed on the same computer and data tier on a separate
- Each of the tiers are installed on a separate computer

When it comes to permissions and data security, they can be allocated on table level and record level. There are four different levels of security:

- Database – check of credentials and permissions (each user had his/her own permissions)
- Company – in a database, multiple companies can be opened with unique permissions of access; accessed can be only the one a user has permissions to
- Object – is a set of permissions that constitute a permission set; these permission sets determine the user access on objects in the database
- Record – is created by enabling security filters on a table data (read, edit, delete)

### 1.4.3 Pantheon, Datalab overview

Datalab Group is a large Slovenian IT consulting group present in the Balkan region, covering the market of Slovenia, Croatia, Montenegro, Serbia, Bosnia and Herzegovina, North Macedonia, Bulgaria, Kosovo, Ukraine and Albania. Their ERP product is Pantheon and besides its sale, they also provide support, training and maintenance services. The firm was established in 1997 by Andrej Mertelj and Tomaž Teyrovsky (Datalab Tehnologije, 2021). Since then, the firms' slogan is 'Turning Data into Profit' (Datalab Tehnologije, 2021).

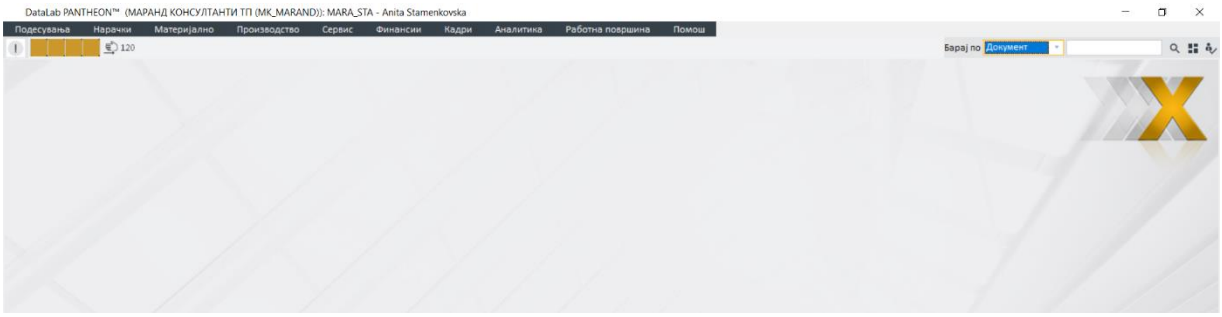
An initial problem this firm faced, were the long implementation timelines and poor customer support, for its shift in 2000, at which Datalab introduced the partnership program. This partnership program enabled outsourced partners to take over sales and ERP enablement, where the main headquarters would develop the software and coordinate the partners. Nowadays, they operate through this main partnership framework.

The EPR system they provide, can be categorized into three main categories:

- Per company size
- Per industry – manufacturing, accounting firms, retail, wholesale, service providers and public service.
- Per company role - sole proprietors – small business owners, accountants, CFOs, CEOs, head of sales, head of purchasing and production managers.

Due to the high localization features established in the core system, Pantheon is the most often chosen ERP solution for the markets this provider operates in. VAT reports and salary calculations are on top of the list required features. Below is a figure of Pantheon's main interface.

*Figure 9: Pantheon main interface nr. 9*




*Source: Datalab Tehnologije (2021).*

Datalab PANTHEON core is established with the client-server model (a distributed application structure that partitions tasks or workloads between the providers of a resource or service, called servers, and service requesters, called clients (Wikipedia, 2021)), and due this, a powerful server is needed - Microsoft SQL Server Express 2014 (free, included in the PANTHEON installation), works with 32- in 64-bit operating systems.

### 1.4.4 SAP, overview

SAP, originally developed and marketed in Germany, is an integrated software package providing core business applications (Martin & Cheung, 2000). SAP comes from System Analysis Program Development (Systemanalyse Programmentwicklung) initially established by a group of 5 friends (former IBM employees), with an idea to create a standard enterprise software that integrates business processes and enable data processing in real time (Isco, 2019). Established in 1972 SAP pioneered Enterprise resource planning software (ERP), by connecting

experience with operations supported with advanced technology as machine learning, internet of things and advance analytics.

Later in 1979 the company started with the development of R/2 (the second generation of their solution). In 1980 they moved to their first building office which how days is their HQ - Walldorf, Germany. Leaving the client-server software as priority, they moved their focus to the Internet and the cloud.

Their analytics says that 77% of world transactions, touches an SAP system. They have 102,400 employees coming from 140+ countries, 22,000+ SAP partners globally, 200m+ cloud subscribers, 100+ innovation and development centers and 27.34b€ as total revenue (Non-IFRS) in FY2020.

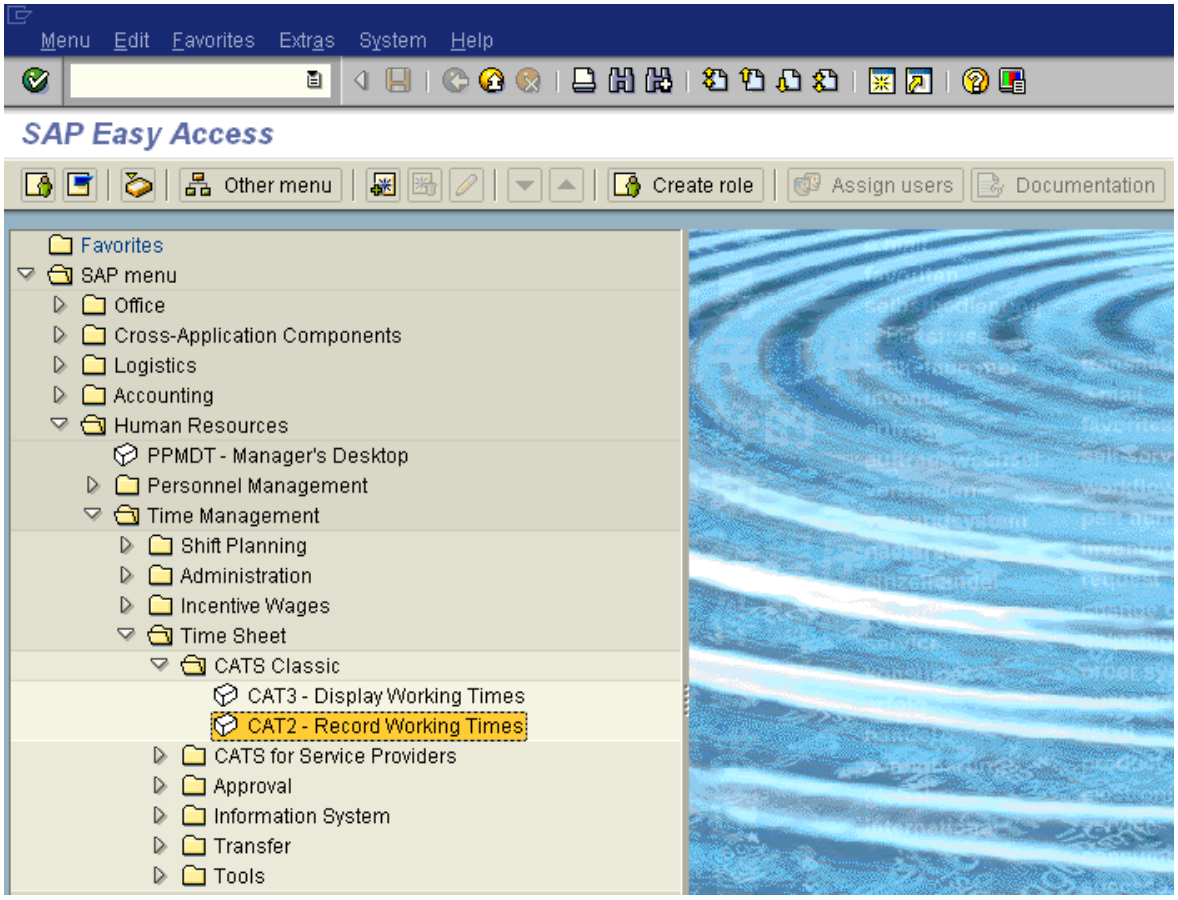
SAP, as a major software provider of the enterprise resource planning (ERP) system, now offers their ERP system as well as software service for sales and finance on an integrated cloud platform (Zhang, Yue, & Hui, 2019). By relying on centralized data management capabilities, SAP provides users an instant view to all business departments real-time. Their software solution is compatible for small business to large corporations.

SAP solution portfolio consists of the following categories:

- ERP and Finance
- CRM and Customer Experience
- Network and Spend Management
- Digital Supply Chain
- HR and People Engagement
- Experience Management
- Business Technology Platform
- Digital Transformation
- Small and Midsize Enterprises
- Industry Solutions

The backbone of SAP is the SAP ERP and throughout the years the software has evolved to many other components. SAP ERP is structure as a three-tier client/server architecture (Three-tier architecture is a software application architecture that organizes applications into three logical and physical computing tiers: the presentation tier, or user interface; the application tier, where data is processed; and the data tier, where the data associated with the application is stored and managed (IBM, 2020). Below is a figure of SAP's main interface.

*Figure 10: SAP main interface nr. 10*




*Source: SAP (2021).*

SAPs datacenters are spread on the 6 continents – North and South America, Africa, Asia, Europe, Oceania. The data centers of SAP meet high security standards. Local disaster (fire, water), data breach or hardware defect are continuously under audits and reviews.

### 1.4.5 Diglas ERP, overview

Diglas ERP is developed by Microlab d.o.o., a company established on the Croatian market in 1990. Microlab d.o.o. is considered to be a pioneer in the development of information-business systems in the Balkan region. Being specialized in business process analysis, communications and computer networks, Microlab develops business applications. Their main product is ERP software DIGLAS which is used by large enterprises in Croatia.

Diglas runs on Windows technology and Oracle relational database. Since the very establishment, Microlab has been an Oracle Partner, working on Oracle application

developments. In 1997 Microlab gained the status of Microsoft Solution Provider as many of the employees held Microsoft certifications.

Diglas as an ERP is split into four solutions:

- Diglas automotive
- Diglas finance
- Diglas logistics and
- Diglas manufacturing

Diglas characteristics are:

- Solution configuration – high level customization without additional development
- Scalability – the system can be deployed very easily thanks to its functionality set regardless of the company's expansion or scale
- Quality and security – the mix of Microsoft and Oracles technologies allows for a stable and reliable performance
- Integrability – a central database running on the powerful Oracle database
- Simplicity of use – the navigation interface is based on Microsoft Windows operational system standards
- Multilingual use – available in few languages
- Compatibility with Microsoft Office products
- Data warehouse – instant display of data into tables and diagrams
- System openness – can be easily connected with e-banking
- Comprehensive functionality – can be linked and connected to many other applications

Because it is based on Microsoft, Diglas main menu looks very similar to Microsoft Dynamics user interface. The individual modules can be found on the left-bottom and accordingly, the documents and functionalities of the particulate module will pop up in the left-up interface of the system.

Diglas as an ERP also holds industry specific functionalities based on the long-term collaboration with their clients.

The technology platform on which Diglas ERP is built on is Microsoft .NET and Oracle 10g as database. The chosen system architecture is based on the principles that represent the best practice of today, and also on Microsoft's recommended n-tier design for NET platform. It is a fully object-oriented model that uses inheritance and polymorphism to create entity-mapped module code.

This model offers a number of advantages:

- Isolation of presentation, business logic and data services
- Scalability and scalability
- Transparent security management
- Adaptability to changes in technology
- Built-in 'Plug and play' modularity
- Adaptability to different types of clients

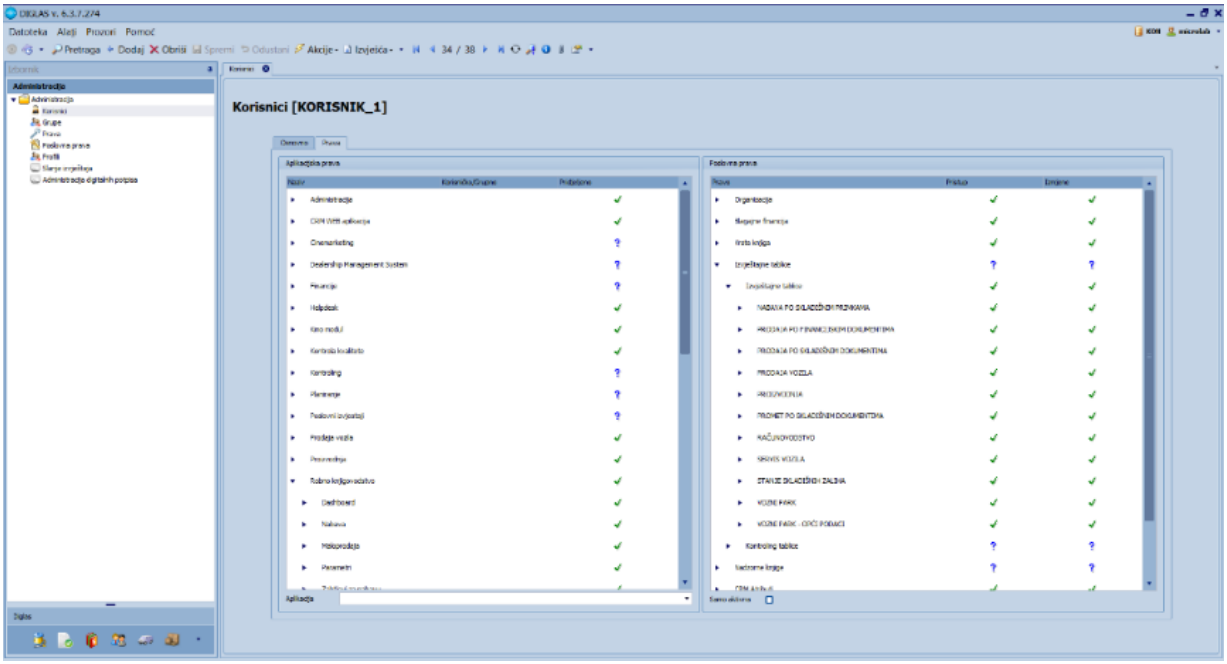
The model of this architecture is based on the principle of layer separation, which means that the system is divided into specific layers that provide services for other layers exclusively through the assigned order. This structure of isolation ensures the modularity and promotion of disciplined development practices.

The basic physical components of the system are:

- Oracle database server
- Application server
- Client computers / workstations

Below is a figure of Diglas ERP's main interface.

*Figure 11: Diglas ERP main interface nr. 11*




*Source: Microlab (2021).*

# 2 CASES OF ERP SOFTWARE IMPLEMENTATION IN CROATIA AND NORTH MACEDONIA

The section below is holding the practical part of this thesis. In order to understand the practical applicability of the ERP solutions shortly described in the text above, let review some cases of local and international applicability of ERPs. The first sections are shortly holding the company profile intro, afterwards a model of selected business process is mapped and further review of the decision for selecting the ERP is present. Data is collected by conducted semi-structured interviews with key people responsible for the digitalization. The interview consisted of open questions about the ERP system they are using, how did they choose that particular system to be the right choice for them, how do they handle the flow of Vendor Bills, which process are automated and which ones are not. Moreover, we discussed about the problems and challenges they face, and we shared best practices. The participants were System Administrators, CFOs and Accountants. The interviews lasted 30-40 minutes each and I was not obtained permission to record the interview due company's internal reasons.

## 2.1 Oracle NetSuite used in IT and software development firm (SaaS Solution, North Macedonia, International firm)

The software development firm is seated in Skopje, North Macedonia with main headquarters in London, Great Britan. This firm has +150 employees which makes them an employee intensive firm. Regarding the equipment, they only possess computers and tech devices for each of the employees, and when it comes to costs, they are only related to rent expenses, salary expenses, travel expenses (before COVID pandemic), expenses related to meals and snacks for the office and main utility bills related to the office itself.

Internally they were not using any kind of ERP solution, only some off-the-shelf applications for tracking employees in terms of: hiring, interviews conducted, employment contracts for existing employees, annexes and schedule data in terms of tracking data for employee spend hours working on a project and the recording of any kind of holiday or sick leave requested.

Before implementing NetSuite as an ERP, their outsourced accounting and financial advisors were using Pantheon. On the level of 50 employees, the collection of vendor bills and reporting itself was pretty easy. But with the growth, it was mostly impossible. The main challenge is (as being a firm with investment received by fund investors (venture capital) and the headquarters itself) the reporting. On the level of Pantheon, reporting meant that the recording of documents is done inside the ERP, but afterwards extracted and conducted in an excel sheet, and then emailed to required shareholders. At this very moment, they also use Inbox Archive Data Center,

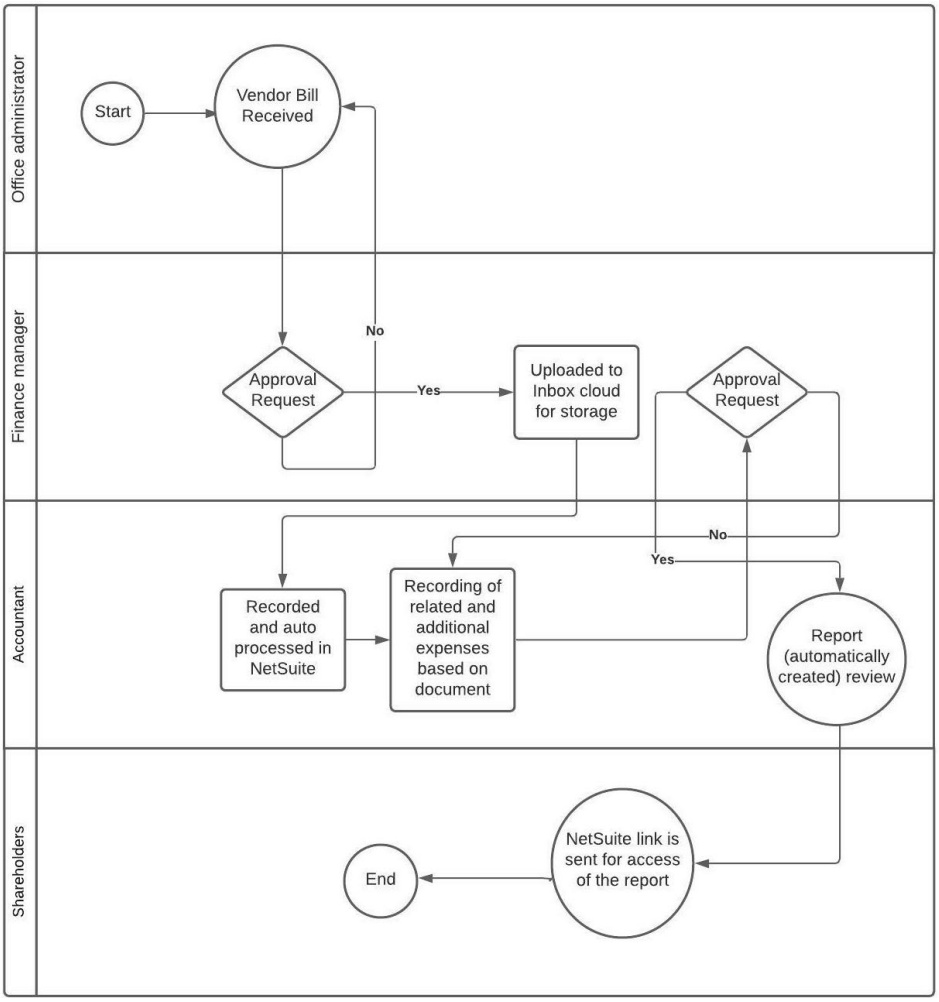
as a cloud platform, to store vendor bills, so that each dedicated employee can have access (including their accountants).

Now when they switched to NetSuite, the business processes have changed, and they are represented in the section below.

### 2.1.1 Model of selected business process

Because of the international presence, the growth and the management structure: access to the system, real-time reporting, visibility of data and the need of BI tools, were considered as very important factors when selecting the ERP. The model of the selected business processes below holds a flow of the movement of documents to the final report creating using NetSuite.

*Figure 12: NetSuite, vendor bill approval and report creation nr. 12*




*Source: Own work.*

### 2.1.2 Pros and cons

The best decision that has been made by this firm is to move from Pantheon to NetSuite, because of the access flexibility and the international presence. Just because many shareholders are involved, they are provided with instant access to NetSuite with only username and password required. This way, based on permissions, they have access to any report needed, in real time. They also have an instant visual snapshot of the current company health, thanks to the dashboards. No report in an excel sheet is longer needed. The sharing of information is more professional, and any kind of mistake can be easily handled and tracked.

The main disadvantage is the requirement of additional modules and applications to be purchased (for example – fixed assets or a separate Scan and Capture application – for the automation of vendor bills recording) and expenses are considered to be high.

### 2.1.3 Decision review

The decision for selecting NetSuite as an ERP was:

- The management structures
- The growth
- No complex business structure to consider an in-house ERP development
- Due the nature of the industry working in, outsourcing of financial data makes more sense

## 2.2 Microsoft Dynamic Navision used in a manufacturing firm (On-premise Solution, North Macedonia, International firm)

The manufacturing firm using Microsoft Dynamics Navision is located in Skopje, North Macedonia, with headquarters in Italy. They operate in the manufacturing industry producing press fittings, hydraulic hoses and BSP adapters. Besides North Macedonia and Italy, they also have subsidiaries in Germany, Poland and USA. In Skopje, the company has about 100 employees and most of them are located in the production department, with only a few in administration, purchase and logistics. Their cost structure is pretty complex: rent expenses, utility costs, transport expenses (import and export), raw and auxiliary material expenses, maintenance costs, salary expenses, costs for work clothes, shoes and many others.

Before Microsoft Navision, they were using Pantheon internally, and also their accountants. They would record vendor bills and import materials in Pantheon, and afterwards, the accountants will auto process all these expenses and raw materials and book them correspondingly. Now that they have switched to Navision, the process is slightly different.

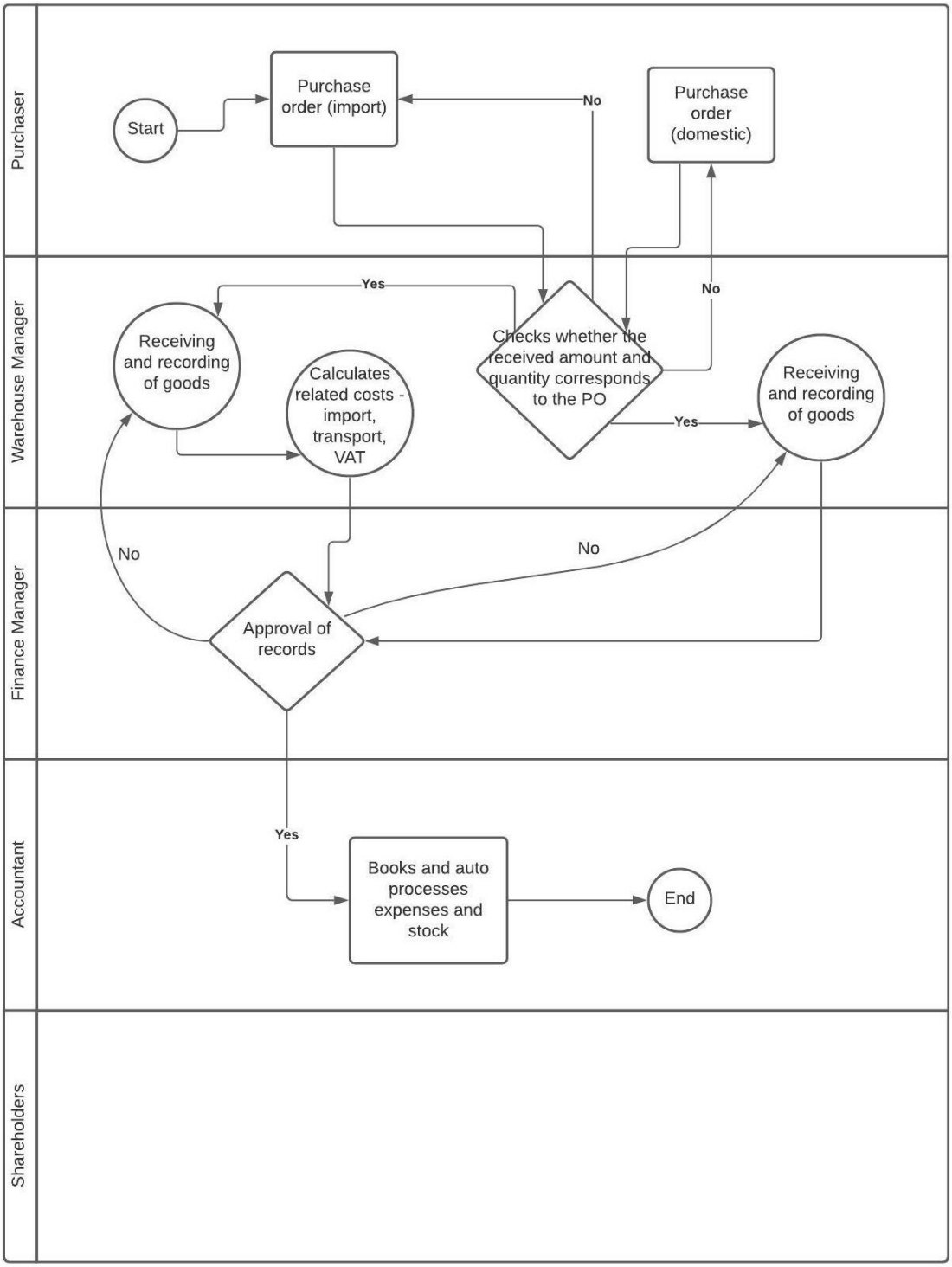
Reporting was always an issue. Multiple excel sheets were exported from Pantheon in order to build a report for management purposes. An instant review of stock level was never instantly clear but reviewed on a daily level with no clear reports. They overcame this process with the usage of Microsoft Navision.

Microsoft Navision was only purchased because the same ERP software was used in the Italian headquarters and the Management and financial team were familiar the functionalities and navigation menu.

### 2.2.1 Model of selected business process

Defined business process in the headquarters, initiated the implementation of Microsoft Dynamics for the firm in North Macedonia. This firm has strong IT skills and most of the implementation was completed by their internal sources. This meant that by establishing the new software, the need of reporting was eliminated. The finance team from Italy can easily log in, and extract any kind of data needed. The model of the selected business processes below holds a flow of the movement of documents and their approval process using Microsoft Dynamics Navision.

*Figure 13: Microsoft Navision, receiving of stock and document approval nr. 13*




*Source: Own work.*

### 2.2.2 Pros and cons

The most important advantage of using an ERP in a manufacturing company is the possibility to track stock level and materials needed in order to avoid a potential stop in the production process. For this company located in Skopje, this is being accomplished with Microsoft Navision and moreover, the one-time record of materials that are being included in the warehouse afterwards are auto processed for booking, is also a step ahead. The automatic booking is accomplished based on the setup, where each document for raw material and item received is configured in a way to track the minimum required level of stock, designated supplier, VAT (value added tax) rate and accounting g/l (general ledger) number.

Additional improvement they accomplished, is the establishment of payment run directly from Navision. This means that once the documents are recorded as expenses, they are extracted locally on a disk and afterwards uploaded in e-banking. When it comes to reporting, as a process is no longer needed. The management team is extracting information from the system itself and create their own. So, when it comes to reporting by the local financial team of this firm, this is not needed.

As main disadvantages are considered to be the following processes:

- The access of the application is a challenge – a VPN access needs to be installed on each user machine
- The process of manufacturing is not established in Navision for the moment – in house built. It is a conservative software that communicates with Navision on a very limited level
- There is a separate database for each of the entities – the report consolidation is always a challenge

### 2.2.3 Decision review

The decision for selecting Microsoft Navision as an ERP was:

- The management structures
- Very good definition of the business process
- Already existing customized system in the HQ of Italy
- Strong internal IT resources

When a firm is operating in multiple countries, the need of consolidated reports is a must. Moreover, a real-time global business insight with consistent processes across the subsidiaries is an important issue to tackle. In order to accomplish this, a very good definition of business process is needed – on a global scale. Out of here, any country-specifics can be reach through

localization functionalities and operational customization. At that point, a configurable, secure, fully automated and compliant system is required, that will provide an instant overview on local, regional and group level.

As of the mentioned above, NetSuite as an ERP solution would be a better option. One database that will unite all intercompany transactions, gives an instant visual overview of stock level, changing the subsidiary context with only one click.

## 2.3 Pantheon, Datalab used in Biotechnology (On-premise Solution, Croatia, International firm)

The firm operating in the biotechnology industry (genetic and genetics modifications) holds its headquarters in Zagreb, but is also present in Bosnia and Hercegovina, Serbia and North Macedonia. They have about 60 employees. They are distributing reagents and genetic material. Just as their business model, so their cost structure is complex. Rent and utility expenses, salary expenses, travel expenses, regular office expenses, maintenance are the main expenditures. They also keep stock and track inventory level. The inventory level is very important as most of the reagents and materials kept are with limited expiration date and usage. The moment of sale, but also procurement and warehouse management are the main challenge. Moreover, procurement is centralized (on a group level) and requires detailed tracking of purchase orders and deliveries and use of unique master data in all subsidiaries which is present in Pantheon. What is not satisfying is lack of working with this unique data in one database.

The most important operational functionality for this firm is the traceability (track inventory, serial numbers, lots, and product line information in real-time. When urgency is required, electronic reporting is the most effective way to ensure effective lot and serial number tracking).

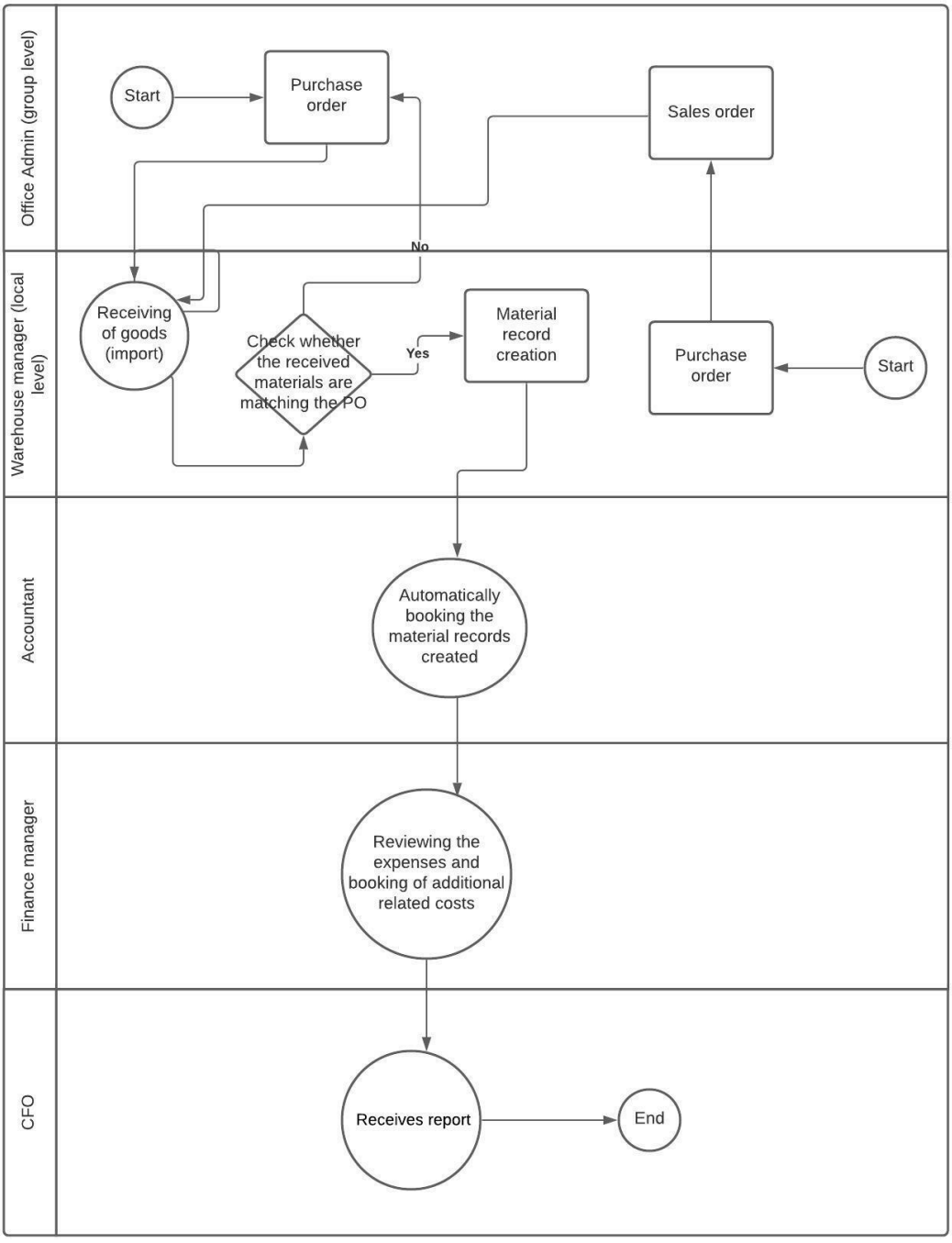
At this moment they are using Pantheon for all different subsidiaries in the Balkan region. This means that each different subsidiary is having its own database. Pantheon as a business solution has predefined flow of processes that cannot be customized or changed per the need of the customer. Moreover, the visibility of stock level is almost impossible. It can only be reviewed by a report which extraction is always a challenge. Moreover, the consolidation of financial statements even for management purposes is a long-lasting problem with handling multiple excel sheets.

### 2.3.1 Model of selected business process

In order to meet local tax and institutional requirements, Pantheon was selected a prime ERP system. Internal reporting, consolidated reporting for internal purposes, instant display of stock

level are main challenges the firm is experiencing, which Pantheon at this moment cannot provide. Multiple employees are working on Purchase orders, material evidence, tracking stock and visibility of data is a main issue. The model of the selected business processes below holds a flow of the movement of documents, stock recording and reporting process using Pantheon.

*Figure 14: Pantheon, vendor bill approval and issuing of purchase order nr. 14*




*Source: Own work.*

### 2.3.2 Pros and cons

The most important advantage of the usage of Pantheon for this company is the high-level localization process held in each of the databases. This means that meeting local requirements of taxation and statutory reporting are at high level, but in the end, not fully integrated with the electronic portals of the statutory reporting institutions. Moreover, the stock level visibility is not present at all, data integration is missing. Different kind of reports need to be extracted for each database of the four subsidiaries separately, which makes the whole process of tracking inefficient.

Another issue that is a challenge are the consolidated reports and reporting in general. Each subsidiary is delivering reports on monthly basis via excel, afterwards they are consolidated for management purposes and the level of error is on a high level.

If the need of the reporting processes is eliminated, then the most of the problem that arrases with the usage of Pantheon is the inability to track the level of stock, and the expiration dates of the reagents they are reselling. At this point the risk of business loss is quite big as holding stock with expiration dates of usage is complete loss of funds.

### 2.3.3 Decision review

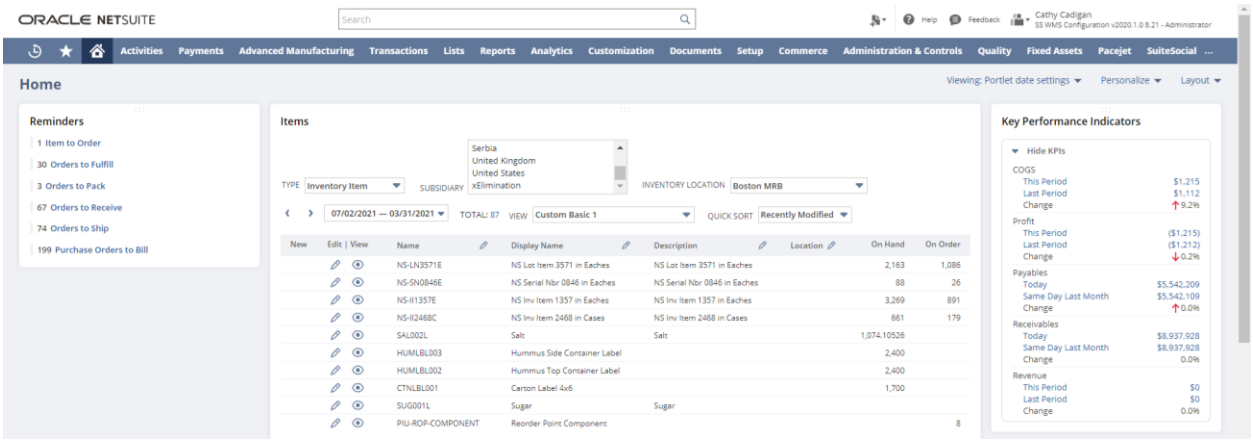
The decision for selecting Pantheon in the first place as an ERP was:

- Strong localization
- ERP partner present in all of the countries

Taking into consideration the sole business nature, this firm processes a large volume of inter-company transactions. This means that only the headquarters are creating a general purchase order towards a main supplier, and afterwards reselling into local firms in North Macedonia, Serbia and Bosnia and Herzegovina. A purchase order from the company of North Macedonia is a sales order for the headquarters in Croatia.

Again, one database holding all international transactions will be best solution to switch to. At this point, NetSuite is the best fit. The access into multiple subsidiaries can be solved through the access level and permissions. Bridging down subsidiary restriction with the execution of intercompany business transactions, handled by multicurrency engine, will not only eliminate the extensive work of consolidation of reports, but save time and avoid the recording of transactions and items four times in four different databases. Moreover, with the thanks of the dashboards and snapshot reporting, NetSuite can provide an instant and real time overview of the stock level for each of the subsidiaries. Below is a figure that clearly pictures this example.

*Figure 15: NetSuite, tracking of stock level snapshot nr. 15*




*Source: NetSuite (2021).*

## 2.4 Diglas ERP used in retail and service firm (On-premise Solution, Croatia, International firm)

The firm using Diglas is having its headquarters in Zagreb, Croatia, and subsidiaries in Slovenia, Bosnia and Herzegovina and North Macedonia. Additionally, they have 26 operating locations and more than 600 employees. They are holding a network of retail and wholesale for new and used vehicles. Just due this, they have multiple warehouse centers, storing spare parts but also offering service through multiple employees that besides selling new vehicles, they also repair old ones. The business model is held in these directions: sale, resale and service. At that point, the expense structure is very extensive, very similar to the expenses listed in the firms as above.

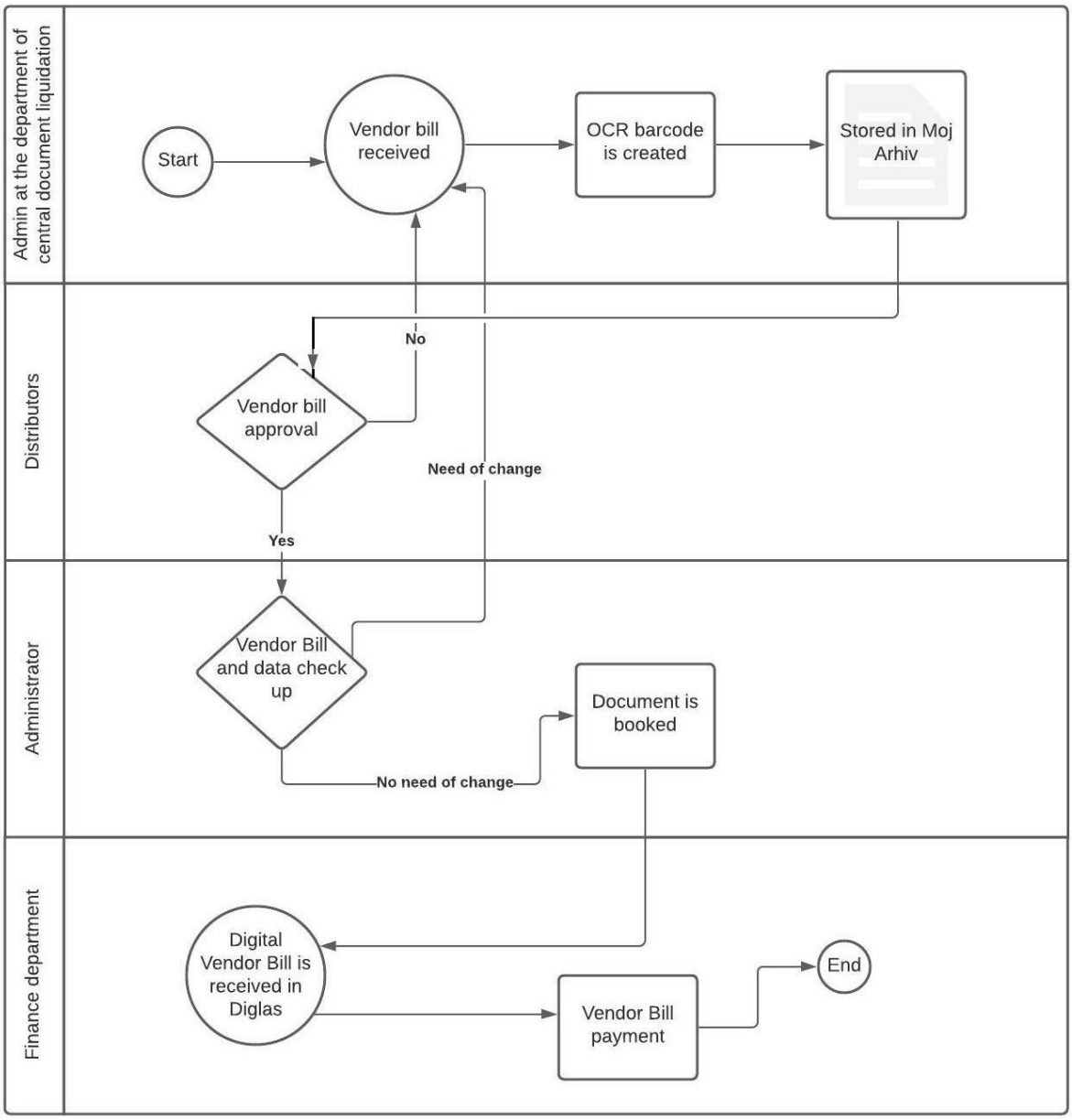
At this moment, they are using Diglas as an ERP. The system is highly customized per the needs of the Croatian market, and based on the same template, the system is replicated in the subsidiaries of the rest of the Balkan region. There are multiple modules additionally customized to meet the business processes of the firm and moreover it is highly localized to all tax and statutory reporting institutions in Croatia, supporting local digital requirements. A VPN (virtual private network) is needed to be established in order for access to be provided to Diglas center access.

In order to handle the large volume of vendor bills, they use an additional application named Moj Arhiv which is an off-the-shelf OCR (optical character recognition) application, used to automate the processing of vendor bills. Moj Arhiv as a separate application is fully integrated with Diglas. The process of receiving, processing, movement to Diglas ERP, to the very document payment, is supported by multilevel approval workflows. The process is in details explained and mapped below.

### 2.4.1 Model of selected business process

Just because of their complex management and matrix approval hierarchy (horizontal and vertical), the model below presents a flow of the movement of documents with an additional integrator (a document management system) – Moj Arhiv.

*Figure 16: Diglas ERP, vendor bill approval and payment nr. 16*




*Source: Own work.*

### 2.4.2 Pros and cons

All the operational processes of this firm are fully automated. Taking into consideration the additional application of the auto processing of vendor bills is of high value for the firm. The advantage of using Diglas ERP means possibility of tracking serial numbers of vehicles and spare parts in terms of treatment of warranty periods. Depending on different warranty conditions, specific transactions in maintenance module are triggered. As Diglas ERP is mainly present in Croatia, it is fully integrated with all institutional authorities in terms of statutory reporting on national and EU level. All financial procedures, related to report submission to tax and financial authorities are completely automated. This means that the level of error is at minimum risk and the operational level of work is more focused to interpreting data, rather than entering it. The payroll module is also integrated and moreover, the payment process as well.

The only disadvantage are the multiple approval levels of a single document. Their business processes in general needs to be reviewed. Just because, with the introduction of an ERP it is very easy to incorporate unlimited approval levels. But, when it comes to efficient and effective usage of the digitalization, maybe the approval processes can be reviewed as a potential obstacle and not an advantage.

### 2.4.3 Decision review

The decision for selecting Diglas ERP in the first place as an ERP was:

- Size of the company
- Strong internal IT skills
- Complex customization needed (because of the nature of the business)
- Strong localization required

Just because a huge investment is already in place for the automation of the business processes withing Diglas, the challenge of replacing this software, needs to be carefully reviewed.
Additional improvement that also needs to be considered, is the automatic warehouse handling of materials and spare parts. That means that introducing an IoT (Internet of Things) scanner and bar code for each of the items. So, once an item is physically moved from the warehouse, the movement information is immediately updated in the ERP system. The Internet of Things is another trend that tends to be introduced at companies which are working on automation of the supply chain.
As the company is listed on Stock exchange, rigid reporting is a must on a quarterly level, with strictly defined deadlines. Additional tool is in place only for this purpose, on extra cost and resources (each time the report is generated).

## 2.5 SAP used in automotive industry (On-premise Solution, North Macedonia, International firm)

The firm that uses SAP is seated in Struga, North Macedonia, and the headquarters are located in Germany. They also have subsidiaries in Hungary, Ukraine and Mexico. The firm is working in the automotive industry, producing cable harnesses and mechatronic assemblies for safety functions, in manual flow production and on partially/fully automated assembly lines. Due the production process, their expense structure is pretty complex, very closely to the one described in the section of the Italian manufacturing firm of hoses.

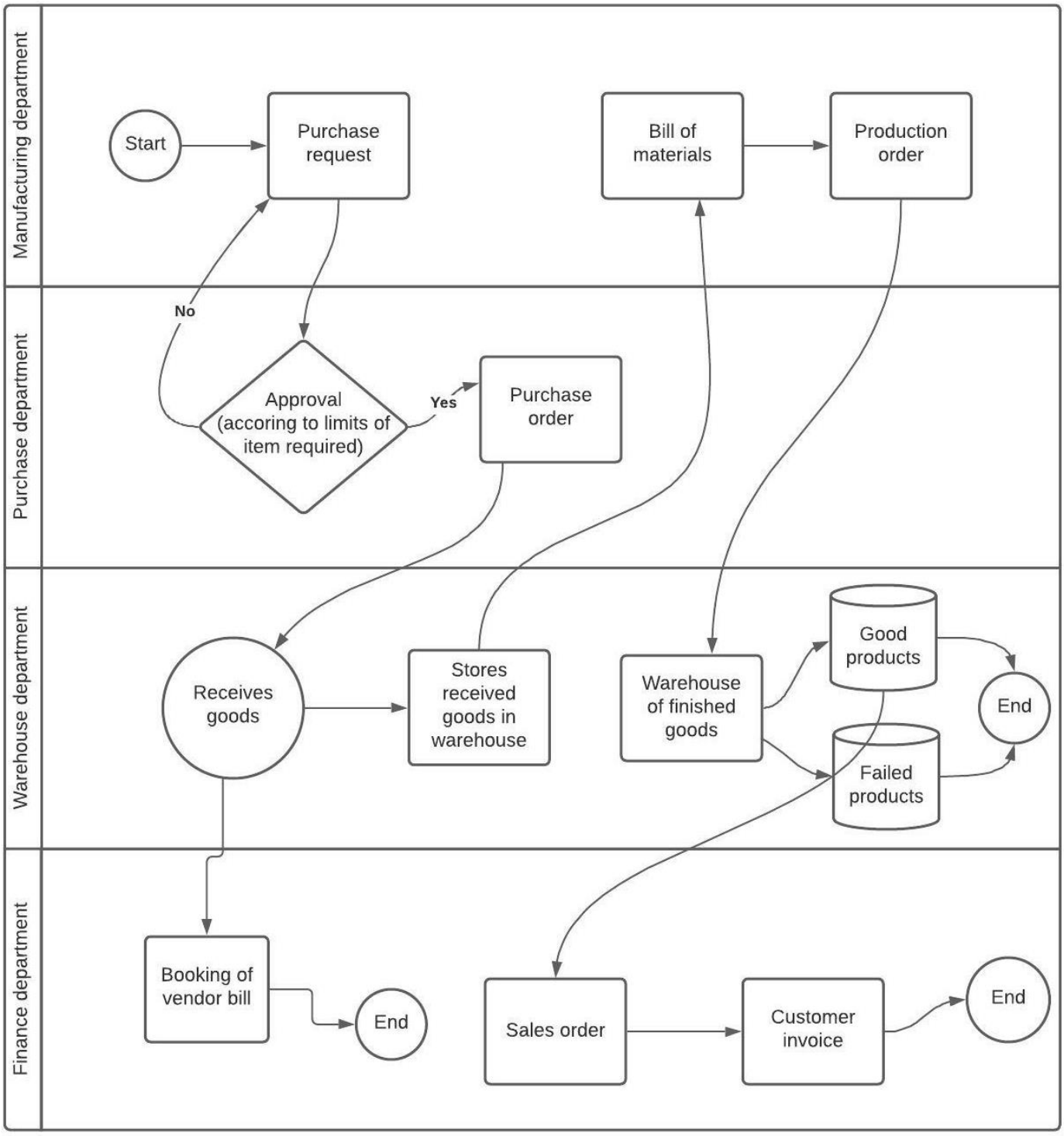
In the very beginning, the firm was using Pantheon as a main ERP solution, but afterwards moved to SAP. The initial for the implementation and establishment of SAP was due the constant usage of the same system in the related subsidiaries, which at the end was a simple inheritance for North Macedonia as well.

The SAP implementation was very slow. The reason were multiple factors, where one of them was the lack of local expertise of SAP. International implementation team was present on-site in Struga multiple times. The main process that was firstly established was the inventory and stock module, and afterwards upgraded with the production process.

### 2.5.1 Model of selected business process

Due the nature of the industry this company is working in, below is a model of moment of goods and their posting in SAP.

*Figure 17: SAP, movement of goods nr. 17*




*Source: Own work.*

### 2.5.2 Pros and cons

SAP is only useful if exclusively used for a manufacturing company. Using it for other types of business and industries, it really does not make sense. One of the most important advantages that can be listed are:

- Very useful for consolidation reports. A super user has access to all potential subsidiaries and the data is in one single database, as a sole source of truth. The rest of the permissions are simply matter of access per transaction level
- Unlimited levels of authorizations and approvals can be established
- Each recorded transaction cannot be deleted, so there is full history present and a time stamp
- Each record is having impact to a different department or level within the database
- Each transaction is linked to another one
- There can never be any kind of improvisation and error
- There is a predefined flow or steps and processes that needs to be followed for a successful additional record to occur
- There is an instant and real time overview of stock in hand, represented as a dashboard

Disadvantages:

- Localization issue – the system is an international one, and created only for EU purposes (for example, it is impossible to auto calculate tax, VAT and customs costs for imports, this needs to be done manually)
- The interface is not user friendly
- It is not a suitable software for finances
- The reporting is always an issue (for example, a full overview of transaction records for a customer is impossible to be extracted; the inly extraction is per transactions)

### 2.5.3 Decision review

The decision for selecting SAP as an ERP was:

- The management structures
- Very good definition of the business process
- Already existing customized system in the HQ of Germany
- Strong internal IT resources
- Complex internal business processes

As a further improvement that can be reviewed with urgency is the process of localization. This localization process will help the finance department to better align with tax and fiscal requirements and match the process of doing business locally in North Macedonia.

# 3 GUIDELINES FOR SELECTING AN ERP SOFTWARE IN NORTH MACEDONIA AND CROATIA

Shivam Gupta, Subhas C. Misra, Akash Singh, Vinod Kumar and Uma Kumar in their paper "Identification of challenges and their ranking in the implementation of cloud ERP" indicate that the size of the organization can be critical in terms of the ERP that can be implemented which can act as single system for majority of the activities performed within the company. Small and medium enterprises (SMEs) prefer to use cloud-based ERP solution which is not expensive and requires minimal investment in IT infrastructure. Also, SMEs at times prefer to use few of the services that the entire ERP module can offer them. This makes them aptly suited for the cloud ERP solution as they can pay for what they use and vendor takes care of the services provided (Gupta, Misra, Singh, Kumar, & Kumar, 2017). On the contrary, large companies would prefer to maintain a stable and robust system that would not be entirely network or internet dependent and at the same time they also prefer the consistency of data (Gupta, Misra, Singh, Kumar, & Kumar, 2017). Following this statement and the practical examples from above, the guidelines for selecting an ERP software in North Macedonia and Croatia, can be categorized as follows:

- Company related (internal fit)
- ERP solution related (functional fit)

When considering the internal fit, the crucial starting point is the business definition in terms of market presence and the size. This means, answering the question whether the company approaching the selection process, is international or a local one. The reason this categorization is considered as a crucial point is because it will lead us to the statement that local companies are very different than international. Their requirements and needs are different. More specifically, this statement is pointing us the question whether international requirements (multi-currency, multi-language, intercompany functionality, consolidations, accountancy localization), can be tackled with a local ERPs functionality. Additionally, this question is leading us the second point – the functional fit.

Let now review both points in details, taking into consideration the practical cases.

## 3.1 Company related, internal fit

Whenever a decision has to be taken, not ERP adoption related, the first approach should answer the vision question. Current landscape and vision well defined, are an excellent basis for any kind of business decision. In terms of ERP adoption, below is a short explanation:

### 3.1.1 Growth and vision

When it comes to the growth and future vision, a company needs to clearly establish a sense of where do they (the company team) see themselves in 5-year timeline (for example). Out of there, start the selection process. If a company is local, with no intentions to expand, a complex solution is not needed. Few users, low level of transactions, no requirements of adopting ERP infrastructure, fast onboarding, simple cost structure are some of the parameters that define a local business requirement. In this kind of case scenario, Pantheon as an ERP can be a perfect solution. Pantheon follows defined business processes. It cannot be customized or altered, and there is no need.

Additionally, if a local business is big and complex, processes large volume of transactions and has all the opposite characteristics as described above, then the decision leads us to subsection "Management structure and budget", explained below.

On the other hand, if a business has international footprint, it has a completely different landscape. At that point, a need of scalable solution is needed. SaaS can more easily help with scalability and resource quantities such as: modules, transactions, space used and users. The SaaS business model supports it. Consolidated reporting should be considered as a must. Due the database structure, NetSuite looks like a perfect fit. This statement is also supported by Bjorn Link when discussing flexibility and changeability in his paper "Classifying systemic differences between SaaS and On-premise". He states that the SaaS EPRs have more advantages than the on-premise ones. This high flexibility is due to resource variability, meaning that multiple new functionalities and modules can be added just by subscribing to new models or application providers (Link & Back, 2015). A SaaS ERP requires no IT knowledge, only a laptop, internet connection and a printer are required for a prime kick-off. A company can easily get on board, focus on internal core capabilities, and grow within one common ERP eco-system. Moreover, if things get the wrong direction (failure is faced) the company can easily drop off. The subscription can be withdrawn and the sole user is not locked in into a large investment with an On-premise solution. Moreover, worldwide statistics additionally approve the statement. According to Yikuan Xue, 64% of worldwide Tech IPO (Initial public offering) companies use NetSuite (Xue, 2021). Moreover, there are studies that have suggested that cloud ERP will take over the on-premise ERP model and cloud-based systems are going to be the backbone of organizations in the future (Gupta, Misra, Singh, Kumar, & Kumar, 2017).

Working on a wider market area requires the management of more differentiated legal and cultural issues, thus introducing a higher level of complexity (Davenport, 1998; Hamel and Prahalad, 1994; Prahalad, 1990; Sanders and Carpenter, 1998), as well as the facing of competitive pressures characterizing the international markets (Bartlett and Ghoshal, 1989; Roth and O'Donnell, 1996; Rumelt, 1974) (Buonanno, et al., 2005).

The same pattern is followed in our practical case above. More specifically:

- The IT company operating with NetSuite – a perfect match. NetSuite can follow the heartbeat of the company growth. Expansion, establishing new international subsidiaries. An IT company is always flexible and much open to movement to other countries easily.
- The biotechnology company operating with Pantheon – a wrong match. Pantheon cannot support international requirements. Pantheon as a selection was only good at the moment, when operating from the HQ level (one entity), enjoying Pantheon advantages of strong localization. Entities operating in different jurisdictions and different internal databases, creates a hairball. In an instance it is bridging the departments, but firmly distancing the data core and the point of the whole business (it merges it again into excel sheets).

Existing literature confirms the existence of a mutual dependence between size and organizational complexity. Kimberly (1976) stressed the necessity of applying a different approach depending on the industry the company belongs to: for the services industry the number of employees has a better fit, while for manufacturing companies the turnover seems to be a better match (Buonanno, et al., 2005).

### 3.1.2 Management structure and budget – how do companies perceive budget?

If a company, local or international is facing complex management structure, complex need of reporting (either for internal or legislative requirements), processes large volume of transactions, a local ERP provider is not the best solution. Proven case of the firm working in Biotechnology industry. No data visibility, tracking of documents, nor display of stock in hand, reporting extracted and match in excel. A major issue to be addressed. Additionally, to some extent, it can be considered that the company working on Diglas ERP (local provider), opposes the statement. On operational level it might make sense. But if taken into consideration the multiple application and tools integrations present, no consolidation capability, reporting and data visibility challenges, can open the question of the selection decision and strictly question whether that a local ERP provider is a good match.

When considering the management structure and budget, it is perceived that if a company has management complexity, a complex ERP is needed. Real-time reporting, instant view of stock on hand, dashboards and BI tool are a requirement. Proven with the case of both manufacturing

companies, using Microsoft Navision and SAP. Moreover, the case of the IT firm working in a complex international management structure, operating with the help of NetSuite has proven to have optimized business process.

If we come back to the case of a local company, which has complex management structure, process a large volume of transactions, faces extensive reporting, to some point the local ERP selection might make sense due to strong localization a local provider can offer. This means high integration with local electronic systems, easy uploading of any kind of reports to tax authorities. At this moment, it is good to check whether a local ERP provider can indeed provide this functionality. Just because the international expertise and IT solution an international provider can offer, can be way more sophisticated (if this provider has a general interest in the particular market). Supported by the case of the manufacturing firm operating on Microsoft Navision. They were firstly working on Pantheon, and after moving to Microsoft Navision, a better establishment of electronic payment run and reporting towards customs is present.

### 3.1.3 Internal resources (Outsource, or keep processes internal)

Bjron Link indicates that On-premise solutions often are considered to be safer as most of their network is established inside the organization, disconnected from the Internet. The data ownership is almost a 100% in the hands of the user. If the system crashed, all data is still recoverable.

Accordingly, companies that have strong IT skills, tend to have internal on-premise solution and a local server. Also, when a company has strong IT skills it is also considered to have a large number of employees. A good example are the companies working in the manufacturing industry (one using Microsoft Navision and the other SAP). Self IT operation involves higher costs. And the IT consideration needs to be altered when data loss or control over the application involves high risk. This happens when the data needs to be secured more professionally or in a different way than the standard provided. In this case, both deployments (on-premise and SaaS) make sense, but provided by an international ERP provider.

## 3.2 ERP solution related, functional fit

The functional fit can be split in two categories: internal business process and clear flow of requirements.

### 3.2.1 Internal business processes

If a company is young, lacks business operation knowledge, has no business processes defined, but is scalable, it can be a better fit to a SaaS solution. This way, a standard practice can take

place and a SaaS solution can be easily implemented. Also, the business model of a SaaS supports it. A user can easily alter the number of modules, users, access, storage required. The statement is supported by Bjorn Link in his study, specifically focusing on the initiation and implementation. He indicates that the onboarding process, the training and the investment in terms of hardware are less challenging within a SaaS solution. A very good example is the IT company operating on NetSuite. On the other hand, if a company is young, lacks business operation knowledge, has no business processes defined, but it is not scalable, then investing in a complex ERP structure, does not make sense. A local ERP provider can be a better fit.

Additionally, in their case study "Classifying systemic differences between Software as a Service- and On-Premise-Enterprise Resource Planning", Bjorn Link and Andrea Back state that if a company is industry specific, has defined procedures and protocols that require no deviations, the focus is on specialization and the ERP presents a strategic differentiator, an On-premise solution, is a good decision. Supported by the example of both companies working in the manufacturing industry with Microsoft Navision and SAP. Again, an international ERP provider is a good fit.

### 3.2.2 Clear flow of requirements

The last, but not the least section. Requirements. We can split them again in two categories: requirements of local and requirements of international businesses. By discussing them on the interviews with the companies, below is a summary of their responses:
Local company requirements:

- User friendly interface
- Fast onboarding
- Cost effective
- No infrastructure
- Local language supported
- Localization
- Easy adjustments for tax and legislation changes
- Vendor reputation and presence on the market

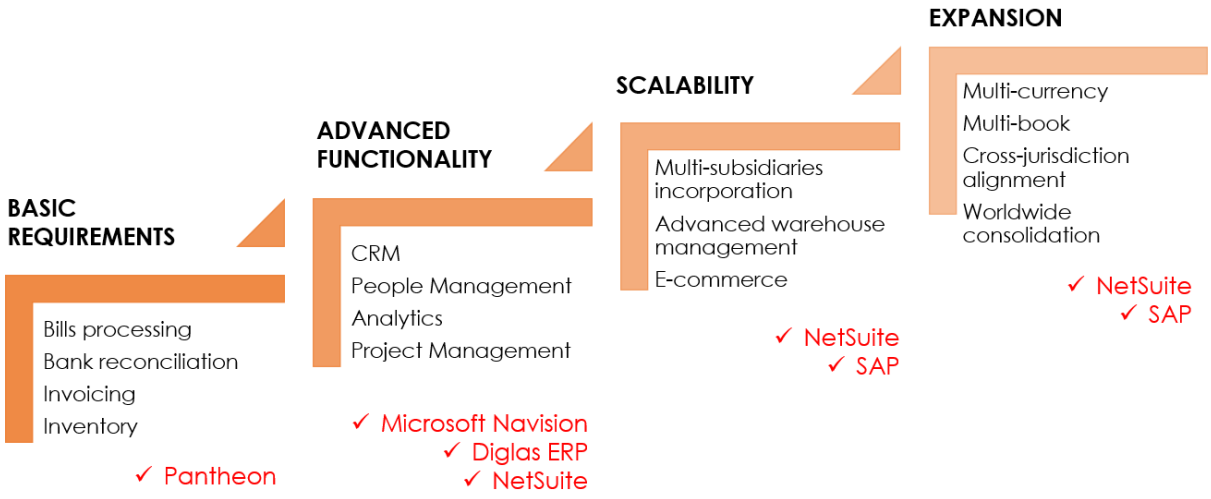
International companies:

- User friendly interface
- Accessibility
- Scalability
- Multi language
- Multi-Currency Management

- Powerful tax engine
- Global Accounting and Consolidation
- Intercompany transactions
- Customizations

Also, depending on the level of the company journey, requirements can be displayed in the picture below. Also, underneath listed are the ERP systems that can be a good fit for each stage, accordingly.

*Figure 18: Stairway of requirements nr. 18*




*Source: Own work.*

Presented below are summary tables that picture how the different ERP software's are tackling requirements in the Croatian and North Macedonian markets. The table and results are based on the conducted interviews and respondents' evaluation.

*Figure 19: Review of local business requirements nr. 19*

| Local business requirements | Oracle NetSuite | Microsoft Navision | Pantheon | Diglas ERP | SAP |
|---|---|---|---|---|---|
| User friendly interface | Best in class | Competitive | Marginal | Competitive | Marginal |
| Fast onboarding | ✓ | Training needed | ✓ | Training needed | Training needed |
| Cost effective | Considered to be expensive | Considered to be expensive | Competitive | Competitive | Considered to be expensive |
| No infrastructure | ✓ | VPN connection needed | Local system installation needed | VPN connection needed | VPN connection needed |
| Local language supported | X | ✓ | ✓ | ✓ | X |
| Localization | Customizable | ✓ | ✓ | ✓ | X |
| Easy adjustments for tax and legislation changes | Customizable | ✓ | ✓ | ✓ | X |
| Vendor reputation and presence on the market | Not so familiar | Competitive | Strong brand image | Strong brand image | Competitive |

*Source: Own work.*

*Figure 20: Review of international business requirements nr. 20*

| International business requirements | Oracle NetSuite | Microsoft Navision | Pantheon | Diglas ERP | SAP |
|---|---|---|---|---|---|
| User friendly interface | Best in class | Competitive | Marginal | Competitive | Marginal |
| Accessibility | Online access | VPN connection needed | Local system installation needed | VPN connection needed | VPN connection needed |
| Scalability | Best in class | Competitive | Marginal | Marginal | Competitive |
| Multi language | Best in class | Competitive | Marginal | Marginal | Marginal |
| Multi-Currency management | Best in class | Competitive | Marginal | Competitive | Competitive |
| Powerful tax engine | Best in class | Competitive | Marginal | Competitive | Marginal |
| Global Accounting and Consolidation | Best in class | Competitive | Marginal | Marginal | Competitive |
| Intercompany transactions | Best in class | Competitive | Marginal | Competitive | Competitive |
| Customizations | Best in class | Competitive | Marginal | Marginal | Competitive |

*Source: Own work.*

Additionally, below is a list of questions and points that a company can use in order to have a clear picture of the whole ERP selection approach. Answering these questions, can help an organization establishing a good basis of current and future needs. The questions are split into few categories (Miller T. , 2020):

- The company itself:

Management structure
Change management strategy
Reasons for changing the current ERP solution
Problem and issues faced with the old solution
Pressure from existing shareholders
Organization type (independent or subsidiaries)
Organization scheme
Budget
Number of business units and departments

- Current landscape:

What business problems are up to be solved?
Current Systems: ERP, CRM, eCommerce in place
Challenges with current systems
Current manual processes
How long systems have been in place?
Other integrated systems?
Does archive of documents needs to be kept?
Is this process automated?
Does real time data visibility is needed?

- Customer experience:

How many customers contact channels are in place?
How does the customer get a notification for an arrived item/good?

- Functionalities in terms of financials required:

Number of users
Who is going to have access to the system?
How many levels of approval are needed?
How many warehouses are in place?
How do inventory is physically managed within the warehouse/across warehouses?

Do serializing of inventory is needed?
How fixed assets are up to be managed?
Are there any custom depreciation methods?
Does project management/job costing is required?
Which payment methods are in use?
Which data dimension should be tracked (cost center, department, category)?
Is the tax and booking calendar equal to the calendar year?
Is a unique chart of accounts in use?
What is the dynamic of financial reporting (legal, by management request, etc.) - monthly, quarterly?

- Inventory management requirements:

Definition and organization of master data
What types of documents are processed in the business system?
Definition of documents from related parties
Definition of business units and warehouses for service work
Definition of general service parameters
Definition of types of work orders (if applicable)

In the very end, the selection process cannot be viewed from a perspective of a local or international ERP solution. Reasons for this statement are the multiple factors and decision holders mentioned in the text above. As a final intention, it is a very good approach if a local company, with established international vision, (during the selection process) can also take into consideration an international ERP provider. Same applies for a local firm, with future large volume of transactions. Local ERP providers should not be excluded. Nevertheless, by comparing the functionalities against the requirements, it can be established that in some cases, an international ERP provider can tackle requirements in more sophisticated, simple and professional way, relying on international business practices (still meeting local legislative), than a local ERP vendor can.

The main limitation of this thesis are the general results, which are based only on the five companies working in different industries. Also, the results are not very representative as the main interviews were conducted with one or two persons, responsible for the digitalization path, CFOs or an Administrator. Therefore, further research should extend the collection of data and include interviews of managers, IT staff, employees on operation levels, from a larger number of companies.

# CONCLUSION

The adoption of an ERP system brings an immense improvement of internal business process, making companies focus on their key skills and core competences. This improvement and change of focus can provide a business with outstanding competitive advantage, good reputation and strong picture on the market. However, the process of the ERP adoption is accompanied with many obstacles: broad range of offerings, constant regulatory changes, insufficient digital skills, lack of mindset and vision in the initial stages. Large potential investment. Therefore, successful implementation of an ERP system does not only depend on a perfect purchase and selection made. Engaging the whole organization, creating an agile and proactive employee mindset and a transformative vision are key core competences that cannot be easily copied.

The available scientific research on ERP system adoption is not present, as most of the text is related to business processes improvement and the applicability of well-defined business process management within an organization. For that reason, the initiative for this study was to work on ERP case adoption on specific market from specific industries, in order to outline a comprehensive approach of the ERP selection process. A critical literature review of available related topics was reviewed, supported by real data cases of both markets and used as primary data of the conducted interviews.

The focus of this study was to present a clear roadmap of the ERP selection process, but both, literature review and practical cases showed that there cannot be a strict definition nor a clear path that can be followed to help companies make the perfect ERP investment (purchase). As described in the guidelines, companies always start from their internal stage and mindset. Out of there they perceive their own perception of the path. The ERP adoption process needs to involve consultants and knowledge or research of – how other companies approached the selection process or how are they satisfied with their current solution. Received results should not be a starting point for the selection. They should be only an indication. Core business processes and core company landscape is. Even more, the research of best practices and international approach of solving cases can be very insightful.

The main limitation of this thesis are general results, which are based only on the five companies. Results are not very representative as the main interviews were conducted with one or two persons, responsible for the digitalization path. Therefore, further research should extend the collection of data and include interviews of managers, IT staff, employees on operation levels, from a larger number of companies.

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# APPENDICES

## Appendix 1: Povzetek (Summary in Slovene language)

Danes se zdi, da je digitalna preobrazba skupaj s celovitimi poslovnimi rešitvami (ERP), poslovno inteligenco (BI), umetno inteligenco (AI), razširljivim jezikom poročanja o podjetju (XBRL), poslovnimi modeli in praksami digitalizacije pogosta tema poslovnih strokovnjakov, vendar še vedno podcenjujejo pomen poslovnih procesov. Podjetja se prišla do točke, ko bi od neznanega ponudnika prek interneta kupovala licence za rešitve ERP, nato pa rešitev zamenjala za novo in drugačno ali ne uporabljala vseh funkcionalnosti (vrnitev na Excelove tabele). Drugi so bolj previdni pri izbiri »prave« rešitve ERP (ki ustreza njihovim poslovnim procesom), vendar se nato soočijo s potrebo po drugačni zunanji aplikaciji in vlagajo v njeno predelavo. Drug primer je uporaba rešitve ERP brez dobrih poročil. V tem primeru podjetje vlaga veliko dodatnih sredstev za rešitev BI, pri čemer je včasih potrebno odpiranje novih delovnih mest ali ustanovitev oddelka samo za ta namen.

Rešitve ERP so postale ena največjih naložb v IT (Chung & Snyder, 2000). Zaradi raznolikosti paketov, ki so danes na voljo, je postopek odločanja zapleten in dolg. Združevanje funkcionalnih področij in poslovnih procesov v integriranem okolju z edinim namenom zagotavljanja širokega obsega uporabnosti za organizacije povzroča še večje težave pri izbiri najprimernejše možnosti (ne izključuje izvedljive alternative domačemu razvoju).

Motivacija te naloge je delo na načrtu, ki jasno prikazuje korake, ki jih mora podjetje upoštevati pri odločanju za ustrezno rešitev ERP, ki zajema scenarije primerov različnih dejavnosti na lokalnih in mednarodnih trgih (Severna Makedonija in Hrvaška). Primarni namen je pregledati postopek izbire rešitve ERP lokalnih in mednarodnih podjetij ter dodatno obravnavati širšo perspektivo, ki opisuje celovitejši pristop k obravnavi postopka izbire ERP. Obravnavala sem naslednje rešitve: SAP, Pantheon, Oracle NetSuite, Diglas ERP in Microsoft Dynamics. Za te ponudnike sem se odločila, saj predstavljajo odlično kombinacijo lokalne (Diglas ERP in Pantheon) in mednarodne (Oracle NetSuite, Microsoft Navision in SAP) programske opreme.

Rešitve ERP ni mogoče uvesti brez jasnega poteka poslovnih procesov. O osredotočenosti na poslovne procese je vredno razmisliti iz več razlogov: pomaga nam videti organizacije s celostnega in dinamičnega vidika, spodbuja organizacije, da se osredotočijo na stranke, in razkriva potrebo po prilagodljivih in odzivnih mehanizmih dostave, spreminjajoče se potrebe strank (Popovic, Indihar Štemberger & Jaklic, 2006). Izbire rešitve ERP se začne z odkrivanjem namena, cilja in obsega procesov. Modeliranje poslovnih procesov lahko izvajalski skupini pomaga razumeti zahteve (modele AS-IS, ki jih je treba razviti še pred iskanjem ustreznih paketov ERP) in bolje predvideti možne rešitve (modeli TO-BE, seznam novih funkcionalnosti se ujema z zahtevanimi).

Mala in srednja podjetja raje uporabljajo ERP rešitev v oblaku, ki ni draga in zahteva minimalne naložbe v IT infrastrukturo. Zaradi tega so primerni za rešitev v oblaku ERP, saj lahko plačajo za tisto, kar uporabljajo, prodajalec pa skrbi za ponujene storitve (Gupta, Misra, Singh, Kumar in Kumar, 2017). Nasprotno bi velika podjetja raje ohranila stabilen in robusten sistem, ki ne bi bil popolnoma odvisen od omrežja ali interneta, hkrati pa bi raje imeli tudi doslednost podatkov. Na podlagi tega in praktičnih primerov lahko smernice za izbiro rešitve ERP v Severni Makedoniji in na Hrvaškem razvrstimo na naslednji način:

- povezane s podjetjem:
    1. Rast in vizija
    2. Managerska struktura in proračun - kako podjetja dojemajo proračun
    3. Notranji viri (zunanje izvajalce ali ohranite notranje procese)
- povezane z rešitvijo ERP:
    1. Notranji poslovni procesi
    2. Jasen tok zahtev

Uvedba rešitve ERP prinaša izjemno izboljšanje poslovnih procesov, zaradi česar se podjetja osredotočijo na svoje ključne sposobnosti in temeljne kompetence. To izboljšanje in sprememba fokusa lahko podjetju zagotovita izjemno konkurenčno prednost, dober ugled in močno podobo na trgu. Zato uspešna implementacija rešitve ERP ni odvisna le od popolnega nakupa in izbrane izbire. Vključevanje celotne organizacije, ustvarjanje agilne in proaktivne miselnosti zaposlenih ter preoblikovalna vizija so ključne temeljne kompetence, ki jih ni mogoče enostavno kopirati.

Večina naloge je povezana z izboljšanjem poslovnih procesov in uporabo dobro opredeljenega managementa poslovnih procesov v organizaciji. Zato je bila pobuda za to študijo prizadevanje za sprejetje primerov ERP na določenem trgu iz določenih panog, da bi orisala celovit pristop k procesu izbire ERP. Pregledan je bil kritični pregled razpoložljivih sorodnih tem, podprt z dejanskimi primeri podatkov na obeh trgih in uporabljen kot primarni podatek opravljenih intervjujev.

Poudarek naloge je bil predstaviti jasen načrt postopka izbire ERP, vendar so pregled literature in praktični primeri pokazali, da ne more obstajati stroga opredelitev niti jasna pot. Kot je opisano v smernicah, podjetja vedno izhajajo iz svoje notranje stopnje in miselnosti. Od tam zaznavajo lastno dojemanje poti. Proces sprejetja rešitve ERP mora vključevati svetovalce in znanje ali raziskave o tem, kako so druga podjetja pristopila k izbirnemu postopku ali kako so zadovoljni s svojo trenutno rešitvijo. Prejeti rezultati ne smejo biti edino izhodišče za izbor, ampak le indikacija.

Glavna omejitev te naloge so splošni rezultati, ki temeljijo le na petih podjetjih. Rezultati niso zelo reprezentativni, saj so bili glavni intervjuji izvedeni z eno ali dvema osebama, odgovornima

za digitalizacijo. Zato bi morale nadaljnje raziskave razširiti zbiranje podatkov in vključevati razgovore z menedžerji, informatiki, zaposlenimi na operativnih ravneh iz večjega števila podjetij.

**Appendix 2: Interview questions**

1. Which ERP software do you use?
2. Why did you decide that this ERP is the best choice?
3. What other systems did you consider when making this decision?
4. Which elements drove the decision for this ERP selection?
5. How does the system perform vs. expectations?
6. Did you have to customize the system? If so, why/how?
7. What significant benefits have you realized since implementing the system?
8. Are you happy with the functionalities?
9. Now the ERP system is in place, can you state that all processes are automated?
10. Are there any processes you still handle manually?
11. Do you think you use the full power of the ERP or just simple and basic functionalities?
12. How long did the implementation take from start to finish?
13. What would you do differently with regards to selection or implementation?
14. How is the support? Is it what you expected?
15. How do you track inventory?
16. How do you process Vendor Bills?
17. How does the production process look like?
18. Please describe in details a process of receiving goods/materials?