

ERP software system comparison between Odoo and Microsoft Dynamics NAV

Is Odoo able to replace the existing Microsoft Dynamics NAV core functionalities?



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ABSTRACT

The purpose of the thesis was to compare the two ERP software systems Odoo and Microsoft Dynamics NAV. The thesis sought to find out if Odoo can replace the existing Microsoft Dynamics core functionalities.

The commissioner is Lasse Seppänen, a principal lecturer at HAMK (Häme University of Applied Sciences) in Finland. The university currently uses Microsoft Dynamics NAV to teach students about business information systems.

The thesis explores the Microsoft Dynamics NAV system's current features and asks how Odoo meets these requirements. The objective is also to determine which ERP system serves the university best.

First, the thesis explains central concepts related to ERP systems. In order to compare the two ERP systems evaluation criteria investigated through literary research. The thesis proceeds by discussing the current ERP requirements. Based on this data Odoo and Microsoft Dynamics were analyzed.

The research compares the two ERP solutions. The outcome of the analysis shows that Odoo is an alternative in comparison to Microsoft Dynamics NAV. The author recommends that the university implement Odoo through the Odoo Education platform.

Keywords Enterprise Resource Planning, Odoo, Microsoft Dynamics NAV

Pages 47 pages including 8 pages of appendices

Glossary

API	Application Programming Interface
BOM	Bill of materials
CRM	Customer Relationship Management
ERP	Enterprise Resource Planning
FIFO	First-In-First-Out
HCM	Human Capital Management
HR	Human Resources
LIFO	Last-In-First-Out
MPS	Master Planning Schedule
MRP I	Materials Requirements Planning
MRP II	Manufacturing Resource Planning
PLM	Product Lifecycle Management
ROI	Return on Investment
SRM	Supplier Relationship Management
UI	User Interface

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1 Introduction

This thesis aims to evaluate two ERP systems for HAMK Häme University of Applied Science in Finland. The question is: Can Odoo ERP replace the existing Microsoft Dynamics NAV in its core functionalities. Microsoft Dynamics NAV is already installed and used by the university. The thesis will concentrate on studying and comparing those two ERP systems.

An Enterprise Resource Planning system is a suite of business applications that organizations use to manage day-to-day business activities. Furthermore, an ERP system is beneficial both for small organizations and large enterprises. ERP tools cover standard business processes in finance, HR, distribution, manufacturing, service, and supply chain.

Lasse Seppänen, a principal lecturer at HAMK Häme University of Applied Science in Finland, is the customer. The main goal is to find out if Odoo can replace the used Microsoft NAV system. Furthermore, is the cost design appealing? Can the lecturer set up and configure companies in the database for students. Is it possible to set up, use, and maintain the software?

To obtain the objectives of the thesis work, the research questions are:

- What are the current features of the Microsoft Dynamics NAV system?
- How does Odoo meet these requirements?
- What is the cost design of both ERP systems?
- Which ERP system serves the university needs best?

2 Enterprise Resource Planning

First, a basic knowledge of ERP systems, their history, and modules is essential to understand ERP systems' principles. This chapter helps to develop procedures and rules to create and evaluate both systems.

In today's world, companies face new challenges of markets and competition. These effects pressures companies to lower total costs. Companies need more efficient supply chain management, better customer service, and coordinated manufacturing. An overview of business functions and departments is essential to find out inefficient processes and leveraging resources. ERP systems enable transparency over the business, even in worldwide distributed business units, and deliver quick valid information for decision making. The speed of decision-making enables companies to act fast in these times, which is almost the main reason why companies use ERP systems (Umble et al., 2003).

Companies integrate Enterprise Resource Planning into significant business processes and data processing. A business process creates value for the customer. It is a stream of activities that needs input and produces an output (Ellen Monk, 2013).

For example, a car manufacturer gets multiple sales orders and needs to deliver different cars to the customers. Therefore, the company considers the following questions and activities to deliver the customer orders. Are these cars in stock? If not, is it possible to manufacture these cars and in which factory? Are the needed raw materials or components on stock? Which parts need to be purchased? ERP systems support an answer to all these questions. The software enables calculations based on bills of materials, lead times for suppliers, and production sites to forecast trustful delivery times. ERP enables the purchasing department to order needed material in time and prepare the car production.

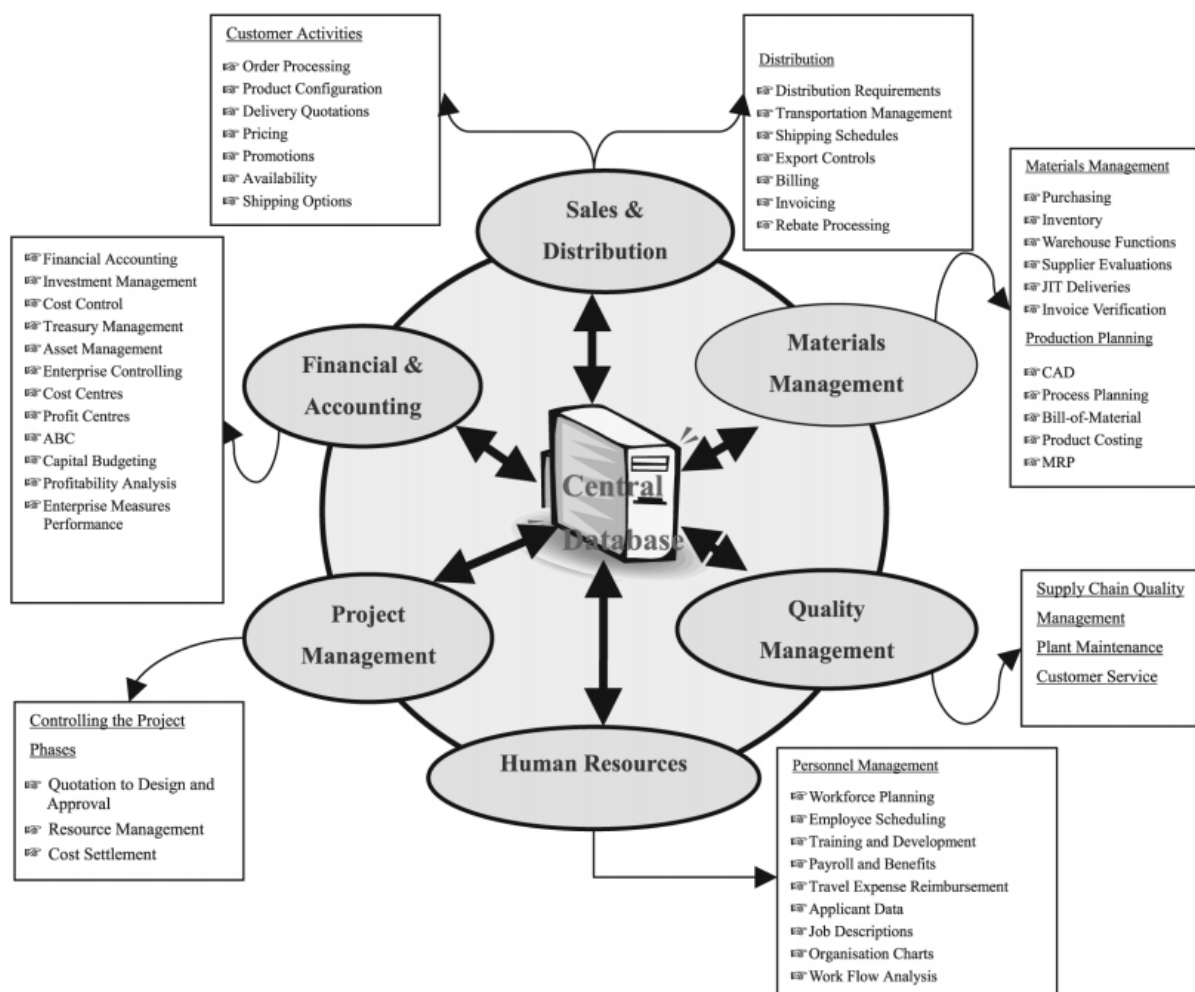
ERP systems cover all aspects of critical operations, such as accounting, manufacturing, purchasing, and sales. Many users think of it as a "do it all" system to do everything from logistical operations to invoicing. This cross-functional integration is one of ERP systems' main concepts because they support and use data in different functional areas (Bradford, 2015).

2.1 ERP Modules

ERP systems come in various modules. Companies from different industries have different needs, and this results in different modules. Companies can combine the modules they need. They can gradually upgrade their system and enlarge the overall functionality. For example, a manufacturing company has different critical operations than a retail company.

Financial Management, human capital management, and logistics are some of the core ERP functionalities. Figure 1 shows an overview of the most popular functions within an ERP system. However, the sub-modules and the names can vary based on the software and the vendor. The ERP system data is accessible by all modules and stored and centralized in a single database (Shehab et al., 2004).

Figure 1: ERP system modules
(Shehab et al., 2004)



2.2 ERP Evolution

ERP systems have advanced in the last thirty years and imported more business processes from other areas. However, it all started in the 1960s with a simple inventory control application to minimize cost and manufacture high volumes (Robert Jacobs & “Ted” Weston, 2007).

In 1970 more and more companies realized that they could not afford to finance large quantities of inventory. Those production-oriented systems were called Material Requirements Planning (MRP). Companies were able to calculate required materials by specifying materials needed for single items. As a result, it was possible to set the required inventory accurately. MRP was an enormous step toward productivity and quality in manufacturing (Umble et al., 2003).

In the early 1980s, MRP evolved and expanded to include even more business functions (i.e., production, marketing, finance). This led to the name “manufacturing resource planning” (MRP II) instead of “material requirements planning” (MRP I) (Robert Jacobs & “Ted” Weston, 2007).

Enterprise Resource Planning became popular in the 1990s. ERP offered more possibilities to integrate more functional areas such as financial management, quality control, order management, warehousing, distribution production, asset management, and human resources management (Shehab et al., 2004).

ERP systems started to include more customer-focused functions such as marketing automation and e-commerce. To meet those criteria, ERP vendors move from a traditional client-server model to a web-based solution (Shehab et al., 2004).

2.3 Microsoft Dynamics NAV

Microsoft Dynamics NAV is an Enterprise Resource Planning system from Microsoft for small and medium-sized companies. Microsoft Dynamics NAV is a Role Tailored ERP system that means every employee has different software access according to their role. For example, when an accountant logs into the system, he has other views and information than a sales manager. This role-tailored experience is a crucial difference from other ERP systems. Accordingly, the users do not need to chase down the information (Chow et al., 2017).

A Danish firm initially developed Dynamics NAV and was bought in 2002 by Microsoft. Since then, the product has had quite a few name changes: Navision Financials, Navision Attain, Microsoft Business Solutions NAV, Dynamics NAV, and Dynamics 365 Business Central (*Microsoft Dynamics 365*, 2020).

Dynamics NAV covers the following business areas: financial management, sales and marketing, purchase, warehouse, manufacturing, job, resource planning, service, and human resources. The following chapters cover these functional areas in more detail. The system can be customized, and it is even possible to develop new functions with the programming language called C/AL (Laura Nicolàs Lorente, 2013).

2.4 Odoo

Odoo is an open-source ERP software that includes CRM, eCommerce, and CMS. Odoo is a highly modular solution that offers various modules and thousands of community apps for business needs. The open-source concept of Odoo appeals to a lot of developers and business experts. The company Odoo S.A. and the community contribute their expertise to build all these apps and modules, which provide superb usability (*Odoo Management Software Evaluation*, 2018).

In 2005, the current founder and CEO of Odoo started to develop the product called TinyERP. Three years later, the name TinyERP changed to OpenERP. The open-source community was growing, and they developed new OpenERP modules. OpenERP expanded and got financial support from several venture capital investors. In 2014 the company and product were renamed to Odoo. The vision is to expand with business solutions like CMS, eCommerce, and Business Intelligence (Pinckaers, 2014).

One of the crucial features of Odoo is the module-based structure. Odoo allows companies to add business-relevant features on-demand, as needed. That makes Odoo flexible and more attractive to small and mid-sized companies than other ERP solutions (Moss, 2019).

With the Odoo Version 9, the company Odoo S.A: started releasing two versions of Odoo. A free, open-source Community Edition supported by the community. Moreover, the Enterprise Edition is not free and requires a monthly payment depending on its region and number of users. The

Enterprise version provides more features and services (Moss, 2019). In appendix 2, there is a complete comparison of both versions. For example, Odoo Community does not have a mobile user interface that allows employees to use their android or IOS device.

2.5 Evaluation Criteria

To compare both systems, Microsoft Dynamics NAV and Odoo, different aspects of the systems have been evaluated according to the following criteria.

2.5.1 Functionality

One of the most important selection criteria is the functionality of the ERP system. Ratkevičius (2012) separates the functionality into three layers – first, the basic system functionality, second, the desirable functionality, and third the additional ERP functionality. Desirable functionality is to improve the companies' overall efficiency and optimize specific business processes. Besides, other ERP functionalities are extending the limits that are “nice-to-have”. For example, in functional business areas, the supply chain or the client relationship management provides the most value. Those areas are essential and should have more attention and consideration in the functional aspect (Ratkevičius et al., 2012).

Companies' business processes are different, e.g., a car manufacturer has different tasks to manage than a retailer. The business processes determine what to do. On the one hand, many software features in the market are available, but not all serve the specific business process needs. For example, a manufacturing company does not necessarily need a point-of-sale module. Customization and implementation costs have a high correlation with the ERP system's functional fit (Ganesh et al., 2016).

2.5.2 Flexibility

Flexibility describes the ERP system's ability to adapt to company needs over its lifetime. Choosing an ERP system is a long-term investment for the business. When an organizational structure, size, and business process change, the ERP should be flexible to suit the business strategy (Alanbay, 2005).

A benefit of flexibility is to configure the business process with relative ease. The absence of flexibility can even make parts of the ERP system obsolete. ERP systems should adjust to a wide range of future changes (Teltumbde, 2000).

On the other hand, too flexible ERP systems create nonstandard business processes which are difficult to handle. In this way, the companies efficiency decreases. Small and mid-sized companies prefer flexibility rather compared to large enterprises (Ratkevičius et al., 2012).

2.5.3 Reliability

ERP reliability is a system stability characteristic that allows users to work properly without interruption. The time to fix technical incidents is a considered factor, too. People in the IT sector generally favor reliability over all other ERP evaluation criteria.

Furthermore, the criteria reliability compared to the flexibility is not bound to a specific business industry (Ratkevičius et al., 2012).

2.5.4 Technology

In a world of rapidly changing technology, ERP technology is essential. ERP technology is crucial for the lifetime and support of an IT system. Otherwise, the company has the potential risk of obsolescence through technology changes. Furthermore, ERP technologies have an impact on scalability and flexibility (Teltumbde, 2000).

Therefore ERP software architecture, database, programming language, business document, and APIs should be evaluated (Ratkevičius et al., 2012). Another important aspect is the operating system. If the company employees use different operating systems, operation independence is mandatory (Ganesh et al., 2016).

2.5.5 Maintenance

The maintenance indicator contains reliable and responsive support and the possibility to upgrade the current ERP to newer versions. Most ERP vendors have a worldwide partner network that can

provide consulting and support. They can help address technical problems or other kinds of consulting like national requirements, law, and new tax regulations (Ganesh et al., 2016).

ERP systems are a long-term investment, and for changing business, environments system upgrades are essential. To upgrade an ERP to a newer version is not easy and a cost-intensive operation. Companies must consider the system's modifications from the vendor and how the transition between the two versions will be (Ratkevičius et al., 2012).

2.5.6 User Friendliness

Not everyone knows IT well. For the average IT user, an ERP system should be simple and easy to understand. The user-friendliness of the software impacts every employee's work efficiency and, therefore, influences the whole company.

Ratkevičius (2012) considers the factor of user-friendliness as one of the most severe ERP selection mistakes. ERP buyers should not only pay attention to functionality and price. They should also deal with future users and their IT skills. Although system functionality is essential for the business, the user interface should be looked at more closely. The user interface includes screens, the ERP system's appearance, and user and system interaction. The UI plays a vital role in improving the users' overall experience. The end user's opinions are valuable.

The ERP system should not be too complicated. The user should efficiently perform a simple task without navigating through unnecessary screens. It should also be possible to work with keyboard shortcuts to speed up the work process (Ganesh et al., 2016).

2.5.7 Total Costs

The total cost of an ERP system is a relatively common evaluation criterion. ERP systems are expensive and have a significant impact on the ROI of the ERP system for the company. Total costs include license, technical infrastructure, upgrading, implementation, and support.

Ratkevičius (2012) differentiates the costs into direct and indirect expenses during the system's total lifetime. Direct expenses involve costs like the software license, hardware, and

implementation. However, indirect expenses are complicated to measure in comparison to direct expenses. Indirect expenses include all kinds of slowdowns, for example, malformed requirements or slow client decision-making, during the implementation process. These costs are essential and should be roughly calculated (Ratkevičius et al., 2012).

2.5.8 Vendor Credentials

ERP systems are a long-term investment. Therefore, the vendor should show commitment to his product. The vendor should offer constant support and upgrades for at least a decade. Companies should assess vendor credentials' product portfolio's importance in the product portfolio (Teltumbde, 2000).

Further selection factors include the image and history of the ERP supplier, product sales, financial situation, and market share (Shehab et al., 2004). Other criteria could be strategic vision, industry experience, and recommendations (Ratkevičius et al., 2012).

2.5.9 Integration and compatibility

ERP systems are one of the company's core software solutions, which store all data and information about business processes and relationships. The integration and compatibility with other software applications is, therefore, an essential factor, too.

Most of the companies also use third-party applications like CRM or SRM. The ERP system should be able to integrate those software solutions and provide appropriate compatibility. For example, the data exchange through import and export should be available (Motaki, 2017).

3 Current ERP Requirements

The university currently uses the Microsoft Dynamics NAV ERP system to teach business and IT students about business information systems. The installed version is Dynamics NAV 2013 R2. The following chapter illuminates the core functionalities, the supervisor database – a helpful tool to set up databases for students – and the current ERP system’s cost design.











3.1 Microsoft Dynamics NAV functionalities

Microsoft Dynamics NAV improved its existing functionalities in the past and added new features over the last years with every software update. This chapter covers the core functional areas of Microsoft Dynamics. Furthermore, Figure 2 shows an overview of the Microsoft Dynamics NAV 2013 departments, including their sub-categories.

Figure 2: Microsoft Dynamics NAV departments

Departments

Choose by department

<p>Financial Management</p> <p> General Ledger Cash Management Cost Accounting Cash Flow Receivables</p>	<p>Payables Fixed Assets Inventory Periodic Activities Setup</p>	<p>Manufacturing</p> <p> Product Design Capacities Planning</p>	<p>Execution Costing</p>	
<p>Sales & Marketing</p> <p> Sales Order Processing</p>	<p>Marketing Inventory & Pricing</p>	<p>Jobs</p> <p></p>	<p>Resource Planning</p> <p></p>	
<p>Purchase</p> <p> Planning Order Processing</p>	<p>Inventory & Costing</p>	<p>Service</p> <p> Contract Management Planning & Dispatching</p>	<p>Order Processing</p>	
<p>Warehouse</p> <p> Orders & Contacts Planning & Execution Goods Handling Order b...</p>	<p>Goods Handling Multipl... Inventory Assembly</p>	<p>Human Resources</p> <p></p>	<p>Administration</p> <p> IT Administration</p>	<p>Application Setup</p>

3.1.1 Financial Management

Financial management is one of the essential features of Microsoft Dynamics NAV. It gives the company a good overview of the financial situations and impacts the decision-making and its

future. It also ensures that the company aligns with bookkeeping rules and regulations, such as generally accepted accounting principles (GAAP).

The Financial Management contains the following sub-categories: General Ledger, Cash Management, Cost Accounting, Cash Flow, Receivables, Payables, Fixed Assets, Inventory, and Periodic Activities.

For example, in the General Ledger part, it is possible to create G/L budgets. The accounting budget differentiates by different periods, accounts, business units, or dimensions. Another example is the Account Schedules feature, with that financial experts can create reporting and analysis of financial statements. It is possible to define and customize the reports to the company's needs.

Furthermore, the Cash Management features help companies to regulate their bank accounts. Another essential support for companies is the Cash Flow feature. Companies need to be careful with their cash flow. Without liquidity, a company will go out of business. Therefore, the short-term cash flow forecast is a great feature to prevent going out of cash.

One more functionality included in the Financial Managements are Fixed Assets. The company can set up its assets, for example, buildings, factories, or furniture. Also, Microsoft Dynamics then tracks the company's depreciation expenses.

3.1.2 Sales & Marketing

Sales & Marketing departments are usually at the point of sales where companies make money. Microsoft Dynamics NAV helps to turn a new contact called "a lead" into a client and track orders. This area manages all standard sales processes information and has the following sub-categories: sales, order processing, marketing, inventory, and pricing.

The user can create, manage, and add new information around the customer for internal purposes. There are a few mandatory fields and many other fields where a salesperson can include additional information. From a business perspective, it is essential to know a lot about its customers and target group. Therefore, a salesperson can create templates for customers and

define specific criteria to categorize them. For example, a salesperson can add them to a particular price group or apply different payment terms.

With the management feature, the Marketing team can create and coordinate marketing campaigns and link them to specific customers. They can also create sales opportunities in the opportunity management area to gain an overview of potential buyers.

After the salesperson created the newly acquired customer, he needs to start the sales process. There are multiple ways to initiate this process. They can start with a quote or directly with an order or an invoice. It depends on the current situation, but usually, it all starts with a quote. Microsoft Dynamics NAV makes it possible to go through a whole sales process. All the data from one document is forward to the next document.

In Microsoft Dynamics NAV, the sales manager can set approval rules. Approval rules are beneficial when the manager needs a credit or amount limits for customers. Then those documents need first approval from management before the order is processed. This function helps avoid non-paying customers, besides longer payment terms influence the cash flow, too.

3.1.3 Purchase

To produce and sell goods, a company needs to buy specific items or materials to produce something. Microsoft Dynamics NAV purchase department includes planning, order processing, inventory, and costing.

The functionalities of this department are likewise covered in chapter 3.1.2, the Sales & Marketing section. Instead of customers, everything revolves around vendors. The required input fields and needed information are almost the same as the customers' information.

Furthermore, there is the possibility for order processing where purchase employees can create quotes, orders, returns, and invoices. Purchase managers can configure different limits for the approval process as well.

The planning module is one of the essential ERP functionalities. It helps companies plan their purchases, reduce inventory stock, and get information about items to restock. The purchase

employee needs to run the calculated plan process, e.g., bills of materials to suggest items and their quantity. To reach the best result, employees need to set the minimum and maximum order quantity. Additionally, there is a drop-ship function available, so a company can order from the vendor and ship it directly to the customer.

3.1.4 Warehouse

The more goods a company stores in its warehouse, the more difficult it is to keep track of the items. When shipping products to customers, the product location is crucial for picking and packing items. The warehouse module includes orders & contacts, planning & execution, goods handling order by order, goods handling multiple orders, inventory, and assembly (Chow et al., 2017).

First, to organize and maintain company inventories, an employee needs to create an item. The item contains much information such as category and product group. Employees can also define methods like FIFO or LIFO. If the company has many similar products that only vary in color or size, laborers can create one item, set multiple variants, and assign required values.

If a company has multiple warehouses, the manager can set up warehouse locations. Workers can transfer the items between their locations, so it is easier to track them. Furthermore, Microsoft Dynamics calculates an item's inventory based on location, variants, or serial numbers.

3.1.5 Manufacturing

If a company constructs and produces its products, it is necessary to manage materials and production processes. The manufacturing area includes product design, capacities, planning, execution, and costing.

For product design, a company needs to create multiple items. The parts and materials necessary to manufacture a product or so to say to build the final product must be administrated. Employees can specify more detailed information, for example, whether the item is purchased, assembled, or produced in the item card's replenishment tab. A Bill of Material (BOM) is required when manufacturing an item. The BOM contains all the quantities of the parts and materials needed to

manufacture the item. Additionally, the production process and the process, and capacity scheduling, routings need to be defined. Routings include methods, operations, and tools.

Capacities differentiate in work centers, machine centers, and resources. Users can assign a machine center to one work center. Furthermore, a work center's planned capacity dwells on the corresponding machine centers' availability and the work center's additional planned availability.

In the area of planning, Microsoft Dynamics NAV calculates and suggests the needed supply for the demand. Users can set different planning parameters, for example, full inventory, manufacturing policy, or MPS/MRP calculation. The company can create forecasts for future demand and improve the customer experience concerning their order dates.

Companies need to figure out the actual cost of the product to calculate their sales price. Microsoft Dynamics NAV offers the costing area where the cost is determined based on historical or expected cost. It consists of material costs, labor costs, subcontractor costs, and overhead costs.

3.1.6 Resource Planning

To get a better overview of the cost or revenue, Microsoft Dynamics provides the Resource Planning module. Resources can be, for example, employees or machinery that involves performing and providing specific services or tasks.

With the resource card, companies can assign their resources for the planning and production process. Resources include and integrate various areas like bills of materials, documents, or general ledgers. After specifying the amount and price per hour, Microsoft Dynamics NAV calculates the necessary resources. To get the best result, employees need to correctly manage resource activities and set up the related costs and prices.

3.1.7 Service

Customer services play a significant role in customer satisfaction and the success of the long-term business. Microsoft Dynamics NAV provides tools to help and support the service process, including Contract Management, Planning & Dispatching, and Order Processing.

Employees can create service items to set up warranty or response time for their services and assign them to items. Furthermore, Microsoft Dynamics can create them automatically when a sold item is shipped.

In some business cases, a company and a customer have a service agreement. In Contract Management, employees can set up contractual agreement templates and specify the service level and their expectations. Hence the company can, for example, keep track of the needed service hours for the specific customer.

When a customer requests a service, employees can create service order documents to enter information about the customer, the service, and service items. The feature allows users to set a service header, service item lines, and service lines. After creating a service order, employees can start repairing and maintaining these service items. Therefore, the service task page gives employees an overview of the service items that need servicing.

3.1.8 Human Resources

The human resources feature enables HR people to track and manage the company's employees. The HR department can store necessary information, qualifications, and contracts or even register employee absence.

This module starts with the employee card, where information about the employee is defined. The card contains information like addresses, communication, social security number, employment date, and notes.

Another feature is to register employee absences, including their reasons for absences. HR people can then analyze these data and help the company find problems early on and figure out the best solution possible.

3.2 Supervisor database

A supervisor database is an additional tool for lecturers to set up and configure databases and companies for students. Microsoft Dynamics NAV does not integrate the supervisor database by default. The software separates between the following three roles: supervisor, administrator, and student enrollment.

Figure 3 shows an overview of an administrator role. In this view, the administrator manages the Microsoft Dynamics NAV databases. He can create a new database from a template, set the department, and assign one or more database supervisors. Additionally, he can delete the old databases which are not used anymore. For example, it is helpful for a lecturer to have a database for each class or year.

Figure 3: Overview Administrator

Actions	Database	Description	Super(s)	Department	Created
Dismount	NAVEDU-0001	KRONUS Finland Oy (30 companies)		TEST	2014-11-24 17:04
Dismount	NAVEDU-0002	KRONUS Finland Oy (30 companies)		Tietojenkäsittely	2015-10-01 10:57
Dismount	NAVEDU-0003	KRONUS Finland Oy (30 companies)		Tietojenkäsittely	2016-10-31 15:00
Dismount	NAVEDU-0004	KRONUS Finland Oy (30 companies)		Tietojenkäsittely	2017-11-01 09:24
Dismount	NAVEDU-0005	KRONUS Finland Oy (30 companies)		Tietohallinto	2018-08-06 14:58
Dismount	NAVEDU-2018	KRONUS Finland Oy (30 companies)		Tietojenkäsittely	2018-11-06 12:54
Mount Remove	NAVEDU-2019	KRONUS Finland Oy (30 companies)		Tietojenkäsittely	2019-04-29 12:29
Dismount	NAVEDU-2020	KRONUS Finland Oy (30 companies)		Tietojenkäsittely	2019-10-29 17:47
Dismount	NAVEDU-2021	KRONUS Finland Oy (30 companies)		Tietojenkäsittely	2020-10-27 09:39
Dismount	NAVEDU-EN-0001	KRONUS International Ltd.		test	2015-01-22 10:41

The supervisor has an overview of all the available databases. Each database can contain different companies and students. After the supervisor selects a database, he can see the following list in Figure 4. The supervisor can add new students to a database and assign them to a new or existing company. He can assign multiple students to one company and can thereby create student groups.

One more feature is to enable or disable all students at once. This feature is beneficial during an exam because the lecturer can enable all student's accounts initially, and after the exam, he can disable all student's accounts. It is also possible to remove students from a database.

Figure 4: Overview Supervisor

Database: NAVEDU-2020		Department: Tietojenkäsittely		Description: KRONUS Finland Oy (30 companies)		Student registration	
URL: http://navi1.hamk.ad.local/Student/Register/FvdybcVisxJVudet							
User	Type	Company	Status	Actions			
Arto Anttonen	STUDENT	KRONUS Finland Oy 22	Enabled	Remove			
Arto Anttonen	STUDENT	KRONUS Finland Oy 17	Enabled	Remove			
Arto Anttonen	STUDENT	KRONUS Finland Oy 22	Enabled	Remove			
Arto Anttonen	STUDENT	KRONUS Finland Oy 03	Enabled	Remove			
Arto Anttonen	STUDENT	KRONUS Finland Oy 19	Enabled	Remove			
Arto Anttonen	STUDENT	KRONUS Finland Oy 20	Enabled	Remove			
Arto Anttonen	STUDENT	KRONUS Finland Oy 28	Enabled	Remove			
Arto Anttonen	STUDENT	KRONUS Finland Oy 13	Enabled	Remove			
Arto Anttonen	STUDENT	KRONUS Finland Oy 02	Enabled	Remove			
Arto Anttonen	STUDENT	KRONUS Finland Oy 22	Enabled	Remove			
Arto Anttonen	STUDENT	KRONUS Finland Oy 25	Enabled	Remove			

3.3 Cost design

The university currently uses the version Microsoft Dynamics NAV 2013 R2, and they do not need to pay any license fees. Nevertheless, this chapter covers the different license types from Microsoft Dynamics NAV 2013 R2 and the new version Microsoft Dynamics 365 Business Central to better understand how much the ERP system usually costs.

In Microsoft Dynamics NAV 2013 R2, there is a distinction between the following license types: Full User, Limited User, Device Only User, Windows Group, and External User. A Full User license grants access to the entire system with full read and write capabilities. In contrast, the limited user license provides users full read but limited write capabilities but is, therefore, less expensive than the full user license (*License Types | Microsoft Docs, 2014*).

Dynamics 365 Business Central is the current version of Microsoft Dynamics NAV. There are two available licensing options: Essential or Premium. The pricing aligns with the number of users and costs \$70 user/month for essential license plan and \$100 user/month for premium plan (*Business Central Pricing | Microsoft Dynamics 365, 2021*), not to neglect other costs such as technical infrastructure, implementation, and support.

4 Comparison of the ERP solutions

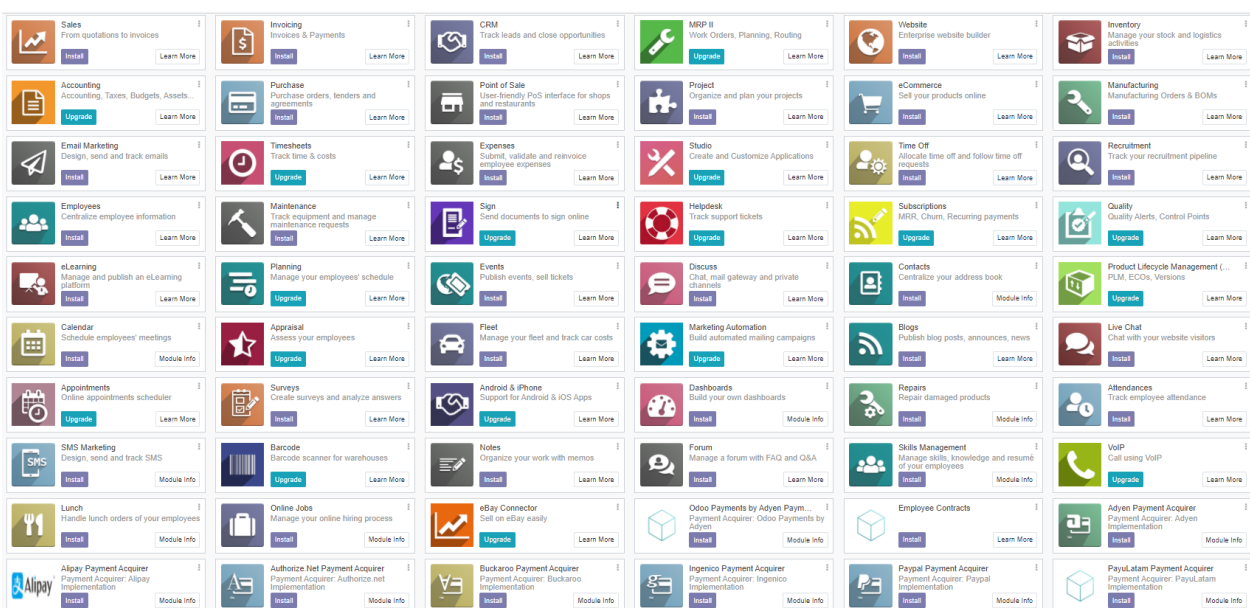
In this chapter, the two ERP systems Microsoft Dynamics NAV and Odoo, are compared based on the evaluation criteria mentioned in chapter 2.5.

4.1 Functionality

In the chapter “Current ERP Requirements” all the core functionalities from Microsoft Dynamics NAV were mentioned and explained. This chapter covers the functionality of Odoo and stresses the differences between both ERP systems. Odoo has two available options, the Enterprise and Community edition. Since the university uses Microsoft Dynamics without any license costs, the feature comparison focuses on the Odoo community edition. Appendix 3 shows an even more detailed feature comparison between Odoo Enterprise and Microsoft Dynamics NAV.

Odoo is a highly modular solution and which allows users to add and install features as needed. Figure 5 shows all the available Odoo Apps. Most of the modules are free, and companies can install them on-demand. In Figure 5, the modules, including the “Upgrade” button, are only available in the Enterprise Version.

Figure 5: Odoo modules



4.1.1 Financial Management

The main modules for Financial Management from Odoo are Invoicing and Accounting. In addition to these modules, Odoo offers several other applications as payment acquirers, for example, Alipay, PayPal, and Stripe.

The invoicing module allows users to turn sales orders into invoices with minimal effort. The company can bill automatically based on different orders and send invoices directly by email as a PDF to customers.

Contrary to Microsoft Dynamics NAV, Odoo Community does not offer an accounting module. It is only available in the Enterprise version, which includes features like bank synchronization and reconciliation. Users can also create earning reports, balance sheets, or cash flow statements.

4.1.2 Sales & Marketing

Users can manage a typical sales process in Odoo where the salespeople can create customers, quotations, and sales orders. Besides that, Odoo offers a CRM module to track leads and close opportunities.

The marketing department can build campaigns using the Email Marketing module. Because of the intuitive and easy-to-use interface, employees can craft email campaigns without any IT knowledge. Other modules that are available for free are Events (organize, publish, promote, and sell), Survey (create surveys and analyze answers), and SMS Marketing (design, send and track SMS).

Moreover, Odoo has integrated a user-friendly PoS interface for shops and restaurants. Additionally, Odoo Enterprise includes calls using VoIP, Subscriptions, and eCommerce Connectors for Amazon and eBay.

4.1.3 Purchase

With Odoo purchase, employees can manage suppliers and purchase orders. Odoo offers an automated purchasing workflow with procurement rules depending on stock levels. Therefore, the company can improve its performance in the supply chain & inventory.

Through a supplier price list & product availability, companies can make smarter purchase decisions based on promotions and quantities using the best price.

Odoo analyzes and forecasts an efficient purchase order plan. Users can generate flexible and individual reports based on supplier's performance, for example, delivery delay, discounts, and quantities.

Additionally, it is possible to manage several companies with Odoo's multi-company rules. Purchase orders and other operations synchronize between different companies or warehouses. This feature can save users much time.

4.1.4 Warehouse

Odoo community also offers a free inventory module for warehouse operations. Odoo uses an intelligent double-entry inventory system to organize its warehouses better and improve their performance and process time.

Furthermore, Odoo has advanced automation features like drop-shipping, cross-docking, and multi-warehouse to manage efficient companies' warehouses. Odoo tracks and follows every stock movement through the supply chain. Users can also create custom dashboards to gain real-time insight into reports. One of the drawbacks is that barcode scanning for logistics operations only is available in the enterprise version.

4.1.5 Manufacturing

The manufacturing category contains MRP II, Maintenance, Quality, and Product Lifecycle Management. The community edition limits the manufacturing area. Users can only create

manufacturing orders and bills of materials. The enterprise version includes additional features like work orders, planning, and routing.

As well the Quality Management and the Product Lifecycle Management modules are not included in the free version. Otherwise, the company could define quality control plans to trigger quality alerts on specific manufacturing operations. The PLM helps the company to communicate more efficiently with integrated document management.

4.1.6 Resource Planning

Odoo does not have a separate module called Resource Planning as Microsoft Dynamics NAV does. However, Odoo Enterprise has a Planning module to manage employee's schedules. Users can analyze Key Performance Indicators (KPIs) to evaluate employee's performance and workload. Odoo can forecast projects and helps to coordinate employees' schedules.

4.1.7 Service

The service module in Odoo is called Helpdesk, and it is only available in the enterprise version. With the Helpdesk, the service team can track, prioritize, and solve customer tickets. Tickets are created automatically through emails, website forms, or live chat on its website. Moreover, with templates and automatic responses, it increases the service team's productivity.

Same as in Microsoft Dynamics NAV, the company can create service agreements with customers. Odoo helps to sell, renew, and upsell contracts.

Additionally, Odoo has a self-service platform as a knowledge base for customers, including FAQs, training videos, and forums.

4.1.8 Human Resources

Odoo Community has a lot of free available modules for Human Resources. It includes the nine following modules: Expenses, Time Off, Recruitment, Employees, Fleet, Attendances, Skills Management, Lunch, and Employee Contracts.

HR managers can manage employees, including recruitment, appraisal, expenses, leaves, and attendances. They can track employee work hours and analyze them through specific criteria like client or project. With the leave management feature, HR managers can manage employee sick days and vacations. Odoo's expenses management allows employees to submit any work-related expenses like traveling by plane or hotel costs. Then HR managers can see an overview of those expenses and approve them. It is also possible to evaluate employees and get feedback based on questionnaires and self-evaluations.

4.2 Flexibility

Odoo is a modular solution and, therefore, very flexible when it comes to business-relevant features. Companies can install and add new modules to their existing ERP solution as they need for the business. Small and mid-sized companies do not necessarily use every feature available in Microsoft Dynamics NAV, and therefore, Odoo is more flexible for their purpose.

Besides, companies can explore the source code of Odoo and make changes and customize it to their own needs. Particularly technically skilled customers can alter the software and adapt the source code to individual requirements and processes. In Microsoft Dynamics NAV, the source code is not open source, which means that customers cannot modify it. However, customizing Odoo modules is a time-consuming process and requires skilled IT professionals for customization (Hiong, 2004).

4.3 Reliability

Since Odoo is an Open-Source ERP system, it concentrates on its quality and reliability. The reason for that is that a lot of passionate developers contribute to the open-source software Odoo. This active community goes through the developed code, discusses and improves it, and provides new value (Ganesh et al., 2016).

Another critical factor Odoo is built based on other open-source technologies and database models. These technologies are a solid foundation for Odoo and provide, therefore, more reliability. For commercial ERP systems like Microsoft Dynamics NAV, one of the technologies can

become obsolete and the customers get isolated because there is no open-source community to support the software anymore (Ganesh et al., 2016).

When it comes to bugs and security weaknesses in the software, there is no clear advantage for Microsoft Dynamics NAV or Odoo. On the one hand, bug fix releases for Microsoft Dynamics NAV are more reliable but can only come from the software provider. On the other hand, bug fixes for Odoo come from a big community of developers fast, but they may not correct the bug entirely and result in other problems (Hiong, 2004).

4.4 Technology

Table 1 compares the two ERP technology used from Odoo and Microsoft Dynamics NAV, including database, programming language, business documents, and APIs.

Table 1: Technical comparison between Odoo and Microsoft Dynamics NAV

(SIT, 2021)

	Odoo	Microsoft Dynamics NAV
Database	Postgres SQL	MS SQL Server
Business Logic Language	Python	AL (proprietary Application Language)
Business Logic Extensibility	Inheritance and overrides	Extensions and defined events
Client Language	XML / HTML / JavaScript	AL (capability to include JavaScript)
Business Documents	HTML converted to PDF	AL Reports via RDL
API (for external interfacing applications)	XML-RPC (other APIs are available)	SOAP / OData / REST

Microsoft Dynamics NAV uses a three-tier architecture the data, server, and client tier. For the data tier, Microsoft Dynamics NAV uses a SQL Server. To manage the business logic is a Microsoft Dynamics NAV Server in place. Windows clients, web clients, and web services are available for the client tier (Chow et al., 2017).

Odoo also uses a three-tier architecture with modern open-source technologies supported by many developers maintaining and providing new features and applications to that software. Odoo uses PostgreSQL as their default database server, an application server written in Python, and a web server where users can connect via their browser as their client layer (Jindal & Singh Dhindsa, 2013).

The modern technologies Odoo uses are an advantage against Microsoft Dynamics NAV. For example, Python's programming language is trendy among young developers and taught in schools and universities compared to the proprietary Pascal-based AL.

4.5 Maintenance

Microsoft Dynamics NAV has a worldwide partner network of resellers that provide consulting and support. In comparison, Odoo has not been around for that extended time in business and has a smaller partner network. However, in recent years Odoo gained much attraction, and the partner network is proliferating.

Companies using Odoo can choose to upgrade their version whenever they want. The company can even upgrade their systems themselves or gather the best price from third parties. For commercial ERP systems like Microsoft Dynamics NAV, the company usually need partners who upgrade the system that is, in most cases, cost-intensive.

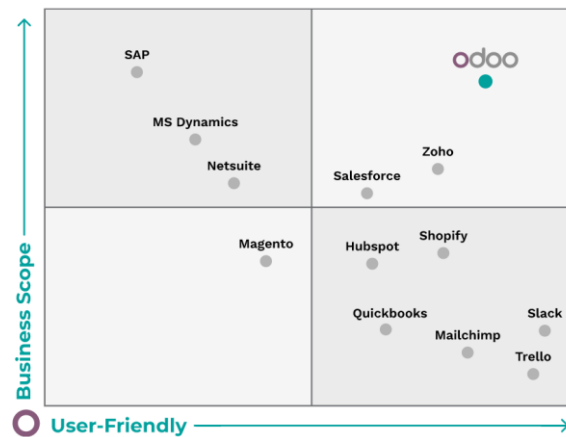
A significant issue is that Microsoft Dynamics NAV 2013 currently ended mainstream support on January 9, 2018. For the next few years, Microsoft gives only extended support to Microsoft Dynamics NAV customers, including security updates. Microsoft officially recommends that customers upgrade to a newer version of Dynamics NAV to ensure supportability (Fosmark, 2020).

4.6 User Friendliness

Odoo's user interface is clean and modern and has simple navigation through the modules. The design appeals to the customer, and for new users, it is easy to get to know the system. However, Microsoft Dynamics NAV looks like a more substantial product and looks similar to other Microsoft Products like word, excel, and outlook.

Figure 6 shows how Odoo reflects its market position. It indicates that they value user-friendliness higher than Microsoft Dynamics NAV. Also, Odoo browser-based solution is far more responsive and faster.

Figure 6: Odoo market position
(Odoo, 2021)



4.7 Total Costs

The total costs are one of the most critical evaluation criteria. This chapter examines the available Odoo versions.

Odoo Community

Odoo's community version is open-source and, therefore, free to use without any license fees. However, the functionalities are limited compared to the enterprise version. The Odoo community version does not have any maintenance cost in the long run because they offer community-based support. Microsoft Dynamics NAV usually comes with high licensing costs, including additional licensed software such as Windows Server and MS SQL Server. Odoo uses open-source technologies which are available for free and cost-efficient. Especially for startups and small companies, the Odoo community version win against the Microsoft Dynamics NAV pricing competition. They can download Odoo for free and test and use it.

Odoo Enterprise

Odoo Enterprise's price depends on the number of apps and users each month. The first module is free; afterward, Odoo offers a free trial for 15 days to test the software. The fee varies from customer to customer and what their business needs are. For small companies, the pay-per-use model is still cost-efficient. For example, the Accounting module cost 16,00 € / month and the Manufacturing module 32,00 € / month. Companies have the flexibility to add modules during the time, and therefore Odoo an optimal choice for growing businesses to adapt software according to their needs.

Nevertheless, the subscription can become expensive very fast. The monthly price for one user, including all 45 apps, is 878,00 € / month. Being a university with more than 100+ users, this will produce high costs.

Odoo Education

Besides the community and enterprise version, Odoo also offers an education plan. The education program includes all the Odoo Enterprise modules and is free for teachers and students with unlimited access to databases, apps, and teaching users. No servers are required; Odoo hosts everything. A lecturer can use the program to teach students about real business information systems and business operations. However, Odoo Education is limited to 10 months, and the database will erase after that time. So, Odoo can accompany students in this period for around two semesters.

Nevertheless, Teachers can set up and share demo databases for their students. These databases can be made public and are therefore not limited for ten months. The education platform allows teachers to reuse databases over multiple classes and years. It is possible to utilize demo data into the system at the time of installing Odoo. The demo data is beneficial for teachers to create courses and business cases.

4.8 Vendor Credentials

Microsoft is one of the largest tech companies worldwide and a leading player in the ERP software market for many years with its Microsoft Dynamics family of ERP solutions. They have a strong partner network that helps customers with implementation and support (Chow et al., 2017).

Odoo is a younger and smaller company than Microsoft; however, the ERP solution is open source. Therefore, companies have access to the source code and online community support, which gives them more freedom and a lower dependency on the vendor.

A benefit of the minimum vendor dependency from Odoo is that customers are not bound to the vendor. Especially for long-term software solutions like ERP systems, maintenance and updates are essential. When the company leaves the market or does not support the ERP system anymore, the customer is at risk because he cannot access the source code.

4.9 Integration and compatibility

ERP systems usually do not fit all the company's requirements out-of-the-box. However, Microsoft Dynamics NAV and Odoo Enterprise include a lot of modules and functionality. Nevertheless, most companies need an extra app for their custom business processes. Odoo, as well as Microsoft Dynamics, offer a wide variety of additional apps. However, Odoo offers almost 30.000 apps and has overtaken Microsoft's additional applications (Odoo, 2021).

Furthermore, Odoo enables developers with the standard programming language python to create customized modules to meet the business requirements. With Odoo Studio, users have a solution to build custom apps, reports, or screens. Microsoft Dynamics offers something similar, of course, but not to this extent.

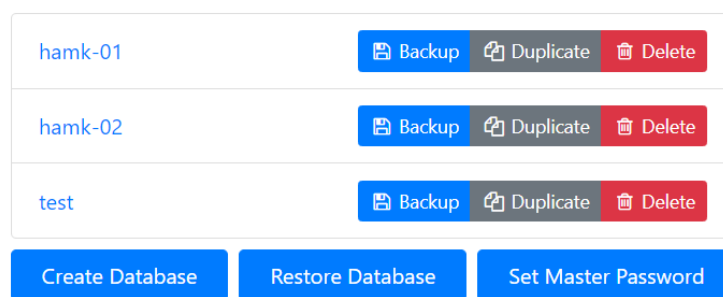
Supervisor database

With the current supervisor database for Microsoft Dynamics NAV, a lecturer can configure databases and companies for students. Nevertheless, Microsoft Dynamics NAV does not integrate

the supervisor database by default, and it is an additional tool. However, Odoo integrates database management and multi companies out-of-the-box.

Figure 7 shows an overview of all the databases. It is straightforward to create, restore or delete a single database. Depending on the university program, the lecturer can create one database per student, class, or year. However, students can join more than one database. It is also possible to include demo data from Odoo, including some products, customers, and invoices.

Figure 7: Overview Databases



In Odoo, the supervisor can create new students, invite them via email, and assign them to a company. During the creation process of a new student, the lecturer can also restrict access to different modules. For example, the lecturer can give students more rights and set the user role administrator to the sales and invoice module. Also, it is possible to group students into one company, as shown in Figure 4 with Student 3 and 4.

Figure 8: Overview Users and Companies

<input type="checkbox"/>	Name	Login	Language	Latest authentication	Company ▼
<input type="checkbox"/>	Student 1	student1	English (US)		Company 01
<input type="checkbox"/>	Student 2	student2	English (US)		Company 02
<input type="checkbox"/>	Student 3	student3	English (US)		Company 03
<input type="checkbox"/>	Student 4	student4	English (US)		Company 03
<input type="checkbox"/>	Student 5	student5	English (US)		Company 05

Furthermore, the lecturer can switch between companies and dive into students' companies to monitor or help them out.

5 Results

This research aimed to find out if Odoo can replace the existing Microsoft Dynamics NAV solution. A weighted decision matrix helps to choose the best ERP system for the university's needs. For the comparison of the two ERP solutions, the investigation of different evaluation criteria took place. The criteria include functionality, flexibility, reliability, technology, maintenance, user-friendliness, total costs, vendor credentials, integration, and compatibility.

Table 2 shows a weighted decision matrix containing all the identified criteria and ERP solutions. First, the criteria are weighted because they usually do not have the same level of priority. For example, in this case, the total cost is more important than the technology criterion. The criteria are rated on a scale from 1 to 5 against the options. The higher the number, the better that criterion matches the option.

Table 2: Weighted Decision Matrix

	WEIGHT	Microsoft Dynamics NAV	Odoo Community	Odoo Enterprise	Odoo Education
Functionality	5	4 x 5 = 20	2 x 5 = 10	5 x 5 = 25	5 x 5 = 25
Flexibility	2	3 x 2 = 6	4 x 2 = 8	4 x 2 = 8	4 x 2 = 8
Reliability	2	3 x 2 = 6	3 x 2 = 6	3 x 2 = 6	3 x 2 = 6
Technology	1	3 x 1 = 3	4 x 1 = 4	4 x 1 = 4	4 x 1 = 4
Maintenance	3	2 x 3 = 6	3 x 3 = 9	4 x 3 = 12	4 x 3 = 12
User Friendliness	3	3 x 3 = 9	4 x 3 = 12	4 x 3 = 12	4 x 3 = 12
Total Costs	5	5 x 5 = 25	5 x 5 = 25	1 x 5 = 5	5 x 5 = 25
Vendor Credentials	1	5 x 1 = 5	3 x 1 = 3	3 x 1 = 3	3 x 1 = 3
Integration and compatibility	4	4 x 4 = 16	4 x 4 = 16	4 x 4 = 16	4 x 4 = 16
SCORES		96	93	91	111

Finally, to decide, the options' score is calculated by multiplying each option's rank by each criterion's weight and tally up each row for a final rank. Odoo Education wins with a lead of 111 scores. Microsoft Dynamics NAV, Odoo Community, and Odoo Enterprise have a score below 100.

Odoo's Community version does not provide the wide range of features that Microsoft Dynamics NAV provides. For example, essential modules like the Accounting and MRP modules are missing in the Odoo community edition.

Comparing the functionality of Microsoft Dynamics NAV to the Odoo Enterprise version, a different result picture arises. Odoo Enterprise can keep up with Microsoft Dynamics NAV and provide even more features.

Besides the functionality, further evaluation criteria are also part of the comparison. These criteria are not as critical as functionality and cost design. However, it is essential to mention that Odoo wins the criteria of flexibility, user-friendliness, technology, and maintenance against Microsoft Dynamics NAV. The reason for that is that Odoo uses open-source technologies and provides a modern and clean look.

The supervisor database was an essential aspect of the customer. Odoo's supervisor database provides similar functionality as the Microsoft Dynamics NAV tool. Furthermore, the supervisor database integrates into the Odoo software. So, no additional tool is required.

The cost aspects play a significant role in that comparison. Odoo Enterprise can become very cost-intensive and is consequently not economical for the university. Therefore, the Odoo education program comes in very handy. Odoo education provides all Odoo Enterprise features and is a university solution to teach students about business information systems. It is free and straightforward to set up with unlimited access to databases and apps.

The Odoo environment enables users to develop modules with Python. Especially for universities that teach Python, it is a great way to teach students to develop and realize business processes with Odoo modules.

To conclude, Odoo Community does not meet the full functionality that Microsoft Dynamics NAV offers. However, Odoo Enterprise meets the current requirements from Microsoft Dynamics NAV and provides even more. With the Odoo Education program, the Enterprise version is free for the university, and an alternative for Microsoft Dynamics NAV since the current Microsoft Dynamics NAV version is out of date and not supported anymore.

6 Summary

Comparing both ERP systems Odoo and Microsoft Dynamics NAV was one of this thesis's primary goals. The research evaluated different types of comparison criteria and concluded that it depends on the Odoo edition. The Odoo community edition can conveniently compete in most of the selected evaluation criteria, but the most important one, the functionality aspect of Odoo Community, does not provide the wide range of Microsoft Dynamics features. Despite the limited functionality, Odoo offers an excellent ERPs system for free.

However, comparing the Odoo Enterprise versions functionality with Microsoft Dynamics, Odoo can meet the university's current requirements. Nevertheless, Odoo Enterprise is associated with costs and not available for free like the community edition. During the research, the author came across the Odoo education platform to serve its needs the best. It provides the Enterprise functionality for free, and it is also easy to set up and configure.

Therefore, it is recommended that the university try out the free education program from Odoo to replace the existing Microsoft Dynamics NAV environment.

During the thesis work, it was exciting to gain deep insights about ERP systems by researching, using, exploring, and diving in-depth into both ERP systems Microsoft Dynamics NAV and Odoo. The author of the thesis learned how small and mid-sized companies map their fundamental business processes in an information system, and he perceived the difference between ERP systems from different vendors. Also, researching academic literature and finding evaluation criteria for the main comparison improved the overall information gathering skills.

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Annex 1: Material management plan

During the thesis work, materials and interviews are collected and stored on the author's computer's C drive. This information is analyzed for the thesis and regularly backed up on an external hard drive. The materials and interview files are retained for one year after the completion of the thesis. All possible personal information will be anonymized.

Annex 2: Odoo Edition Comparison (Odoo, 2021)

Odoo 14	Enterprise	Community
General		
Unlimited Functional support	✓	x
Version Upgrades	✓	x
Hosting	✓	x
User interface		
Desktop - Web Browser	✓	✓
Mobile - Android and iOS	✓	x
Websites		
Website Builder	✓	✓
eCommerce	✓	✓
Amazon Connector	✓	x
eBay Connector	✓	x
Blogs	✓	✓
Forums	✓	✓
Events	✓	✓
Live Chat	✓	✓
eLearning	✓	✓
Sales		
Sales	✓	✓
CRM	✓	✓
Digital Phone (VoIP) Integration	✓	x
Point of Sale	✓	✓
Loyalty Programs and Gift Cards	✓	x
Subscription	✓	x
Sign	✓	x
Rental	✓	x
Invoicing	✓	✓
Payments	✓	✓
Operations		
Accounting	✓	x
Comprehensive Accounting	✓	x
AI	✓	x
Project	✓	✓
Inventory	✓	✓
Purchase	✓	✓
Manufacturing (MRP)	✓	✓
Workcenter, Control Panel, Scheduling	✓	x
Maintenance	✓	✓
PLM	✓	x
Quality	✓	x
Helpdesk	✓	x

Field Service	✓	x
IoT Box	✓	x
Human Resources		
Employees	✓	✓
Departmental Dashboard	✓	x
Recruitment	✓	✓
Fleet	✓	✓
Time Off	✓	✓
Expenses	✓	✓
Employee Referrals	✓	x
Payroll	✓	x
Expense digitalization (OCR)	✓	x
Reimbursement in Payslip	✓	x
Appraisal	✓	x
Productivity Tools		
Discuss	✓	✓
Notes	✓	✓
Calendar	✓	✓
Timesheets	✓	✓
Grid view	✓	x
Timer	✓	x
Reminder	✓	x
Timesheet validation	✓	x
Awesome Timesheet (Mobile App)	✓	x
Appointments	✓	x
Approvals	✓	x
Documents	✓	x
Spreadsheet	✓	x
Planning	✓	x
Marketing		
Email Marketing	✓	✓
Mailing Templates	✓	x
SMS	✓	✓
Survey	✓	✓
Social	✓	x
Marketing Automation	✓	x
Customization		
Studio	✓	x

Annex 3: Feature Comparison (Odoo, 2021)

Sales	Microsoft Dynamics NAV	Odoo Enterprise
B2B Sales		
Quotes to Orders	✓	✓
Electronic Signature	x	✓
Online Payment	x	✓
Quotation Templates	x	✓
Upselling & Cross-Selling	x	✓
Subscription Management	x	✓
In-Store Sales		
Point of Sale (retail)	x	✓
Point of Sales (restaurant)	x	✓
Online Sales		
eCommerce	x	✓
eBay Integration	x	✓
Advanced Products		
Multi-Level Variants / Matrix Items	✓	✓
Configurable Products	✓	✓
Kits	✓	✓

CRM	Microsoft Dynamics NAV	Odoo Enterprise
Sales Flow		
Leads Nurturing	x	✓
Lead Scoring	x	✓
Leads Management	✓	✓
Opportunities Management	✓	✓
Pipeline Management	✓	✓
Third-Party Management	✓	✓
Communication Tools		
Customer Multi-Address	✓	✓
Calls / Meetings / Mail	✓	✓
VOIP	x	✓
Email Integration	✓	✓
Live Chat	x	✓
Full Customer History	x	✓
Email Templates	x	✓
Opportunities Analysis	✓	✓

Accounting & Finance	Microsoft Dynamics NAV	Odoo Enterprise
Internal Process		
Analytic Accounting	✓	✓
Alerts	✓	✓
Budgets	✓	✓
Expenses	x	✓
Assets Management	✓	✓
Real-Time Inventory Valuation	✓	✓
Analytic Reports	✓	✓
Daily Operations		
Bank Interface / Automatic Sync	✓	✓
Quick Reconciliation	✓	✓
Deferred Revenues	x	✓
Checks Management	✓	✓
Invoice Management		
Invoicing Management	✓	✓
Batch Send (email, standard mail)	x	✓
Third-Party Follow-Up	✓	✓
Payment Automation (SEPA)	✓	✓
International		
International	✓	✓
Multi-Company	✓	✓
Multi-Currency	✓	✓

Marketing	Microsoft Dynamics NAV	Odoo Enterprise
Actions		
Mass Mailing	x	✓
Blog / SEO / Web Pages	x	✓
Events	x	✓
Marketing Automation	x	✓
Drag & Drop Page Editor	x	✓
Marketing Campaign	✓	✓
Contacts Segmentation	✓	✓
Follow-up		
Survey	x	✓
Keyword Marketing	x	✓
Visitors Tracking	x	✓
Social Media Management	x	x

Warehouse Management	Microsoft Dynamics NAV	Odoo Enterprise
Routing		
Basic Inventory Management	✓	✓
Multi-Warehouse (for one company)	✓	✓
Pick-Pack-Ship	✓	✓
Products		
Traceability, Lots, & Serial Numbers	✓	✓
Expiration Dates	x	✓
Multiple Unit of Measures	✓	✓
Reporting		
Stock Assessment (FIFO, CUMPS)	✓	✓
Perpetual Reports (real-time, automatic)	x	✓
Forecast	✓	✓
Advanced Products		
Logistic Rules (advanced routings & push/pull rules)	✓	✓
Storage/Picking	✓	✓
Barcode Support	x	✓
Customer Portal	x	✓
Shipping Integration (DHL, FedEx)	x	✓

Manufacturing	Microsoft Dynamics NAV	Odoo Enterprise
Manage		
MRP	✓	✓
Routings	✓	✓
Order of Assembly	✓	✓
Costing	✓	✓
PLM	x	✓
Work Sheets	✓	✓
Traceability	✓	✓
Quality Management	x	✓
Repairs Management	✓	✓
Maintenance	x	✓
Schedule & Plan		
Scheduling	✓	✓
Product Variants	✓	✓
Multi-Level BOM's	✓	✓

Purchase	Microsoft Dynamics NAV	Odoo Enterprise
Purchase		
Request for Quotation (RFQ)	✓	✓
Purchase Tender	x	✓
Pricing & Discounts	✓	✓
Fulfillment		
Make-to-Order (MTO)	✓	✓
Minimum Stock Rule	✓	✓
MPS	✓	✓
Manage		
Invoice Control	✓	✓
Reception Control	✓	✓

Services & Projects	Microsoft Dynamics NAV	Odoo Enterprise
Basic Project Management	✓	✓
Lean Approach / Kanban View	x	✓
Planning	✓	✓
Customer Oriented		
Helpdesk / Support	x	✓
Timesheets	✓	✓
Email Integration	x	✓

Human Resources	Microsoft Dynamics NAV	Odoo Enterprise
Recruitments	✓	✓
Appraisals	x	✓
Leaves/Holidays	✓	✓
Fleet Management	x	✓
Payroll	x	x
Expenses	x	✓

Usability & Productivity	Microsoft Dynamics NAV	Odoo Enterprise
Usability		
Full Web Interface	✓	✓
Theme Store	x	✓

Fully Responsive	x	✓
Mobile (Android / iPhone)	✓	✓
Real-Time Chat & Emails	x	✓
Dynamic Reporting / Pivot Table	x	✓
Full Keyboard Support	✓	x
Keyboard Shortcuts	✓	✓
Multi-language	✓	✓
User Interface		
Kanban	x	✓
Gantt	✓	✓
Calendar	✓	✓