

A New ERP Model that Would Meet the Requirements of Small Businesses in Macedonia

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Abstract— the growth of business is fast and the impact on the economy is becoming bigger. As a key component of business strategies in order to increase productivity, to raise performance expectations and to maintain competitiveness, companies operating in industries are focused on developing more sophisticated computerized tracking systems.

The main objective of this paper will be to analyze the existing Enterprise Resource Planning System in Republic of Macedonia and investigating the possibilities of integrating them into more advanced computing infrastructure. Another important issue is that the research will be focused on proposing and implementing a new service based Enterprise Resource Planning System model.

Keywords— ERP Solutions, Cloud Computing, Service Oriented Architecture

I. Introduction

Enterprise Resource Planning (ERP) is extremely important to the success of a company business. The core idea behind the ERP system is to integrate all departments and functions across a company into one comprehensive, integrated system so that various areas of businesses can more easily share information and communicate with each other [2, 4].

Recently, manufacturing organizations are focused to run their entire business in the cloud. The cloud infrastructure is itself a service provided to those who means storing and accessing data and programs over the Internet. Those programs will let the company to manage the entire business by offering programmed function through service-oriented APIs.

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The advantage of cloud computing is that it is much cheaper to control resources as services and paying as you go and as you need them [3, 6].

The main motive for this research and implementation of ERP using cloud services is because cloud services make the work of the enterprise and access to the enterprise's service more effective as well as it increases the collaboration among enterprises.

The objectives of this research are as followed:

- Analyzing the existing ERP Systems in Macedonia in order to identify inefficiencies and problems.
- Categorizing the components into homogenous groups with consideration to different factors.
- Identifying how to design and program services in a more domain oriented way suitable for ERP Systems.
- Identify the protocols or methods in service design as well as how identified concept can be implemented and improved in service environment.
- ERP System Implementation details.
- Identifying the advantages and disadvantages of using SOA based ERP System.
- Analyzing the impact on employees, managerial and organizational performance of an enterprise.

The rest of the paper is organized as follows: in section two is presented the analysis of existing ERP Systems in Macedonia followed by the proposed new model of ERP System in Macedonia in section three. Section four emphasizes the importance of the proposed model and section five concludes this paper.

II. Analysis Of Existing ERP Systems In Macedonia

Analysis of existing Enterprise Resource Planning Systems in Macedonia is based on a questionnaire made by the students of SEEU in the majority of small companies in the Republic of Macedonia. It was concluded that:

- A good number of inventory data of manufacturers, small retail outlets, and other small businesses is generally stored in hard copy.

- Most of the existing Enterprise Resource Planning Systems in Macedonia are developed by local software developers running on the legacy systems and their maintenance, at the same time they provide limited number of services to the suppliers, their partners and customers they serve. That is the reason why the vendors and customers in Macedonia still have to use phones, faxes and individual e-mails in order to place or obtain orders. In this manner, the requirement of the human involvement implies that the business process cannot survive with inefficient and inaccurate manual processes. Figure 1 shows a general architecture of existing Enterprise Resource Planning Systems in Macedonia.

years, they are either very expensive or cannot be customized according to the requirements of existing manufacturing organizations in Macedonia.

Considering the shortcomings of existing ERP systems in Macedonia, we propose a new model for the ERP implementation that would meet the requirements of the wide range of small businesses.

Another very important decision that we had to make is whether to implement cloud based ERP or one that is installed locally. Locally installed solutions are installed locally on the company's hardware and servers and should be managed by their IT staff. In this manner, the management of the software as well as the procedure of upgrading, the maintenance of the hardware, servers, and facilities necessary to run it requires

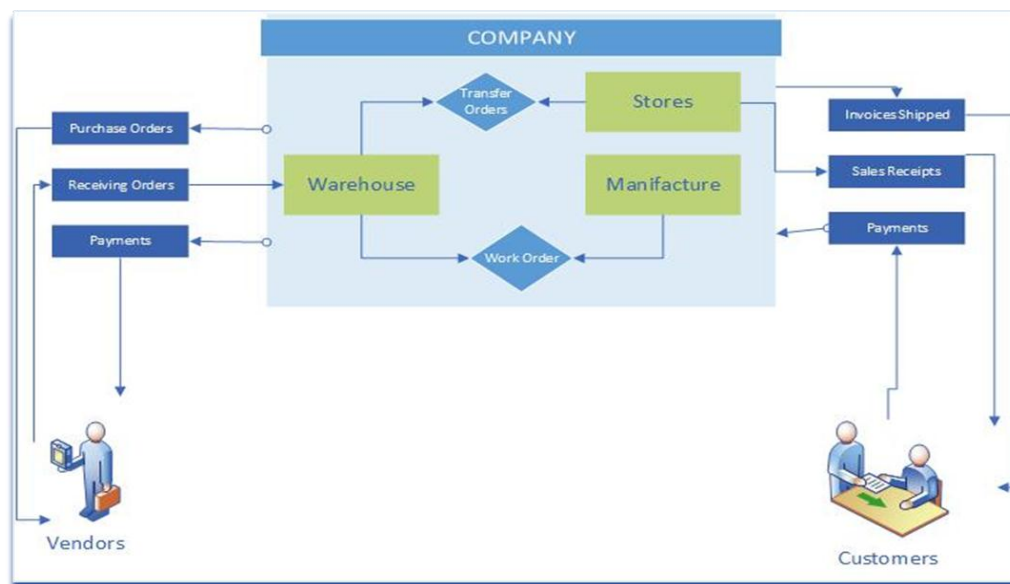


Fig. 1. The defined components used in existing ERP's in Macedonia

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III. New Model For ERP Systems In Macedonia

Fulfilling the requirements of the customers is always ongoing and complex process [10]. Although a huge number of service-oriented industrial ERP are delivered already several

continuous investments. Besides, if the companies don't have enough experienced IT staff, they will have also to invest more time and money in additional personnel and their training.

Cloud ERP is provided as a service, also called SaaS (Software-as-a-Service) where services can be of different kinds starting from Web based e-mails, database processing services and inventory control. Using this type of deployment, a company's ERP software and its associated data are managed in the Internet "cloud" by the vendor and the end user is free to use the services from anywhere. Another important issue is that services offered from the cloud may be composed with other existing in-house services in order to create SOA-based composite applications [6, 4, and 8].

Based on the advantages of Cloud ERP and the requirements of enterprise stockholders, the decision was to propose and implement a new ERP System model that will

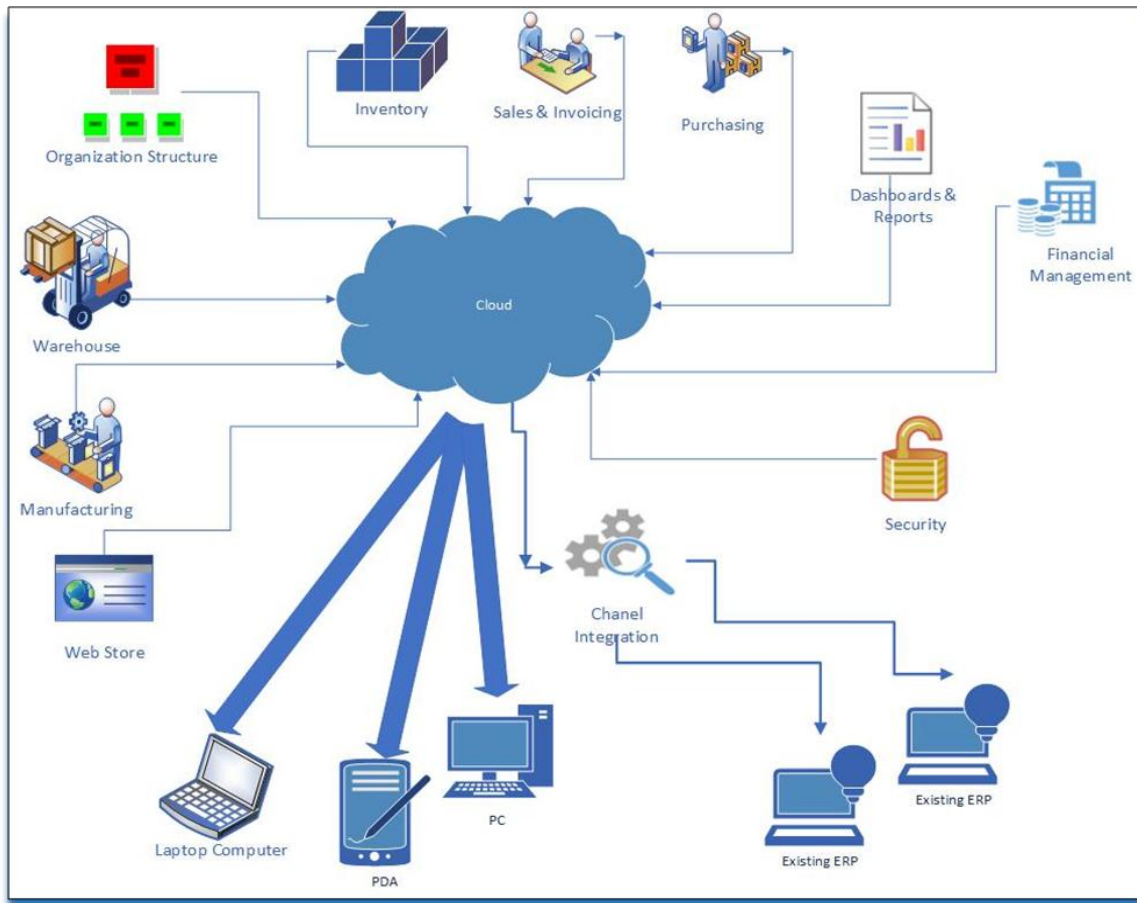







Fig. 2. New Architecture Model for ERP Systems in Macedonia




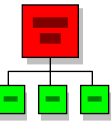

automate key business processes through the cloud, the key business will reduce the investments for system maintenance as well as will provide a channel integration in order to synchronize external with internal business activities. Figure 2 shows the proposed architecture model.

Enterprise Resource Planning is a complex process. The process begins with the product arrival at the warehouse and can continue until it is delivered to its final destination. For that reason the entire “Life Cycle” of the ERP is broken into distinct phases. These include Inventory Control, Warehouse and Product Management components which are linked with the Core Modules of Sales, Purchasing, and Accounting etc. The identified modules which will be provided as services are shown in Table 1.

TABLE I. DESCRIPTION OF SUPPORTED FEATURES AND SERVICES.

 <p>Warehouse Management</p>	<p>Is used to record and manage a wide range of operations like managing, shipping and monitoring physical inventory.</p>
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 <p>Manufacturing</p>	<p>Is used for managing manufacturing process and tracking production workflow like recourse capacity planning, production planning, items used in Manufacturing, multi-level Bill of Materials (BOM) and work order entries.</p>
 <p>Inventory Management</p>	<p>Is used for item and inventory maintenance, stock management, inventory locations, inventory pricing and cost, inventory adjustment and transactions.</p>
 <p>Sales & Invoicing</p>	<p>Is used for managing customers, customer’s branches and groups, sales orders and quote, sales order list (recent orders, open orders, invoiced orders, paid orders) and invoicing.</p>
 <p>Purchasing</p>	<p>Is used for material requirements and procurement planning, managing vendors and vendor’s purchase orders.</p>

<p>Financial Management</p> 	<p>Is used for managing bank accounts and Cash book, budgeting, book keeping entries and details automatic generation and financial reporting.</p>
<p>Dashboards & Reports</p> 	<p>Is used for warehouse, manufacturing, inventory, purchases, sales and customized dashboard and report generation</p>
<p>E-Commerce Web Store Solution</p> 	<p>Is used for providing to the customers an online catalog of products, online buying, customer's view of their sales orders, shipments and invoices, customer support and consulting services.</p>
<p>Organization Structure and Business Partners</p> 	<p>Is used for managing organization hierarchy structure (departments, branches, factories, point of sales, warehouses, and employees) as well as managing organization business partners.</p>
<p>Chanel Integration</p> 	<p>Is used for integrating the ERP system with other existing systems.</p>

iv. Importance Of The Proposed ERP System Model

Both the industrial as well as the academic stakeholders will profit from the results of this research:

- The participating companies will benefit from a comprehensive requirements specification and variability model. This modeling will provide a basis to improve the development efficiency, the software quality and the management and evolution of the studied product portfolio.
- The participating university will benefit from gaining a comprehensive case study of the SOA based method [3] with an industrial software product line. Figures and Tables

v. Conclusion

This paper presented an in-depth analysis and implementation of Enterprise Resource Planning System using cloud services, which based in different researches made in this area [1, 7, and 9], is obvious that is part of next generation of information technology. Besides, the developed model will provide to the users a well-defined user interface, easy to use and manage, as well as to the companies in Macedonia, an easy way to reuse already developed components and to integrate them with new system.

Finally, the conclusions and recommendations will be guideline for business managers, IT professionals, and researchers in this area.

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