

THE ADOPTION OF SMART TECHNOLOGIES IN ERP IMPLEMENTATION FOR STRATEGIC MANAGEMENT IN THE CONTEXT OF INDUSTRY 4.0: A CASE STUDY.

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Abstract: New business models, in the era of Industry 4.0, developed with the help of digital transformations through the integration of advanced technologies have the ability to respond quickly to market changes and are characterized by fierce competition to maintain and meet customer needs by offering customized products in a short time and at the lowest possible cost. Achieving these objectives has been made possible with the help of enterprise resource planning systems such as ERP (Enterprise Resource Planning), which have become indispensable tools for managing a business. The use of ERP has become a necessity when talking about the efficiency and competitiveness of an organization. Besides the benefits that the integration of this system offers in the efficient functioning of a business, there are also challenges faced by manufacturing organizations, among them is the particular attention to cyber security due to the large volume of data that it manages and its ability to function without errors and interruptions for a long period of time, as these systems are critical to the daily operations of an organization. In addition, ERP systems often require harmonization and additional development to adapt to the specifics and operations of each business, leading to additional costs and delays in full adoption.

1. INTRODUCTION

The success of ERP systems among business management systems after 1990 was a strong point for information systems (IS) researchers, so that a number of specialized studies appeared after that year. ERP systems are an integral part of a company's day-to-day business; without them, in 2024, the performance of every operation would be inconceivable, due to the weight of the existing modes of operation in the diversity of economic and management processes. In order to overcome these obstacles it is necessary to take into account the two parts involved in this process, namely the technological and the human, which are interdependent and contribute significantly to the success of the business (Abdinnour-Helm, S. and Lengnick-Hall, M., 2023).

This article contributes to the theory by exposing the possibilities of implementing ERP in order to eliminate the obstacles that are encountered all the time in the industry in general, thus being able to present a systematic review of the literature to analyze the trends and challenges brought by the implementation of ERP systems, as well as a set of best practices to support companies in integrating this system taking into account the technological innovations of the moment. The functionality of ERP systems has evolved from the management and control of material inventories to supply-chain management, supply-supply chain management, customer relationship management, today ERP systems have integrated five real-time interconnected modules required to manage and respond to the increasingly complex needs of a business. The development of ERP (Enterprise Resource Planning) systems has been strongly influenced by technological advances, and the software industry has had to continually adapt to keep pace with these innovations (Hofmann P., Samp C., Urbach N., 2020).

Globalization and the implementation of emerging technologies have brought opportunities to companies and the use of ERP systems within multinationals has become indispensable, with major benefits in increasing the operational efficiency of the manufacturing industry. However, capitalizing on the use of these ERP systems is affected by certain obstacles. This comprehensive research investigates the major challenges faced by industries in implementing ERP systems.

The main difficulties are related to the high cost of implementation, especially for small and medium sized enterprises, but also the reluctance of employees to change, the insufficient level of qualification and the fact that the system needs to be constantly updated. At the same time, there are also technical and operational challenges such as the compatibility between current enterprise resource management systems and modern ERP solutions, as they require high performance integration capabilities. The literature review revealed other obstacles that can slow down the implementation of ERP systems, such as cultural and organizational barriers, team conflicts, lack of IT culture, different ways of thinking, slow adaptation of business processes due to lack of a well developed organizational culture, etc.

Considering the significant use and challenges of ERP systems, it is not surprising that research on the benefits and successful implementations of ERP systems has increased. One area that has gained the attention of researchers recently is the ability of organizations to maximize the value and benefits gained in the process of implementing ERP systems.

In this context the alignment of a company's strategic goal and objectives with its information system has been recognized as a crucial issue. ERP systems, especially SAP have become closely linked to the strategic management of organizations (Schlund, S., and Schmidt, M., 2021). Thus, new software platforms are gaining popularity as they are deployed to help organizations effectively collect, organize and disseminate operational data across the enterprise. They enable decision-makers at all levels to access the information they need, thus playing a vital role in the strategic management of organizations. In Figure 1, the one below, the evolution of ERP systems is highlighted, with the fourth generation discussing the impact of smart technologies on these types of systems (Kirana D. A., et. all, 2021).

Enterprise Resource Planning evolution

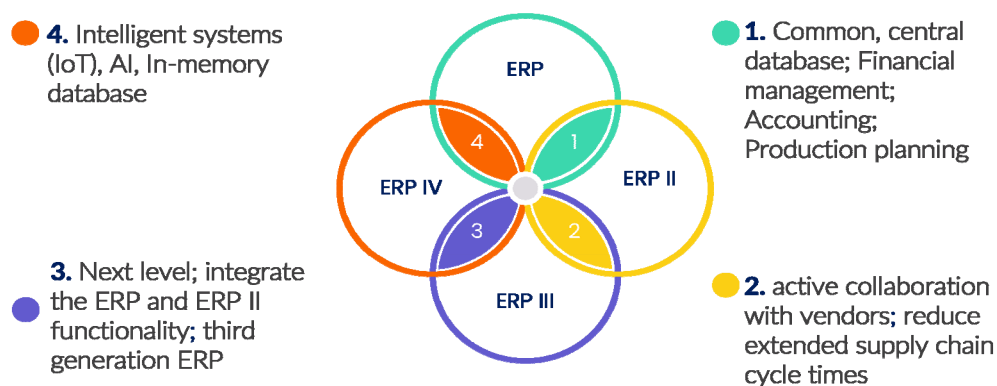


Figure no. 1 – The ERP evolution using technologies

Smart technologies are increasingly finding their way into the processing and re-engineering of business processes, as well as into the application of intelligent ways of working with integrated software systems.

2. LITERATURE REVIEW

ERP integrated systems are found in a number of specialized studies, a number of researchers highlighting, in different phases of the implementation process, minuses and pluses, depending on how well such an implementation project is understood. Failures in the implementation of ERP systems are also discussed, the main causes being those related to not understanding how to work with such an integrated system, poor quality of ERP implementers, poor implementation management, poor cost planning, etc. One of the key points mentioned in several case studies is the choice of the software vendor, very often also the one who implemented the solution (Blount Y., et all, 2016). In the following, the authors bring up some aspects to be taken into account: the purchase of an ERP is very

much related to the study of the implementation strategy and the business processes that will be modeled in it; understanding the company's needs - current and future; highlighting and accounting for the business processes that will be intelligently modeled in the ERP system to be implemented (Kedziora, D., and Hyrynsalmi, S., 2023). One thing to keep in mind is the implementation methodology, which in turn is essential in any project and deviations from it can have an impact on the whole process.

3. RESEARCH METHODOLOGY

This article is based its research methodology on the analysis of economic processes, in this case the economic process of subcontracting - using Interventionist Research (IVR) as a research method. This method will help us, not only to observe the changes realized along the process, but to intervene and model the economic process of subcontracting by adding a software robot that is intended to automate certain repetitive steps (Hofmann P., et. all, 2020). This will help us to make the economic process run faster, eliminate work errors, and keep the process running smoothly. Below, in the Figure 2, the authors present a diagram showing the existing steps in the economic process as well as where the application of software robots has been a real success in terms of cost versus time, speed of work and continuous use (Sönmez, Ö.E. and Börekçi, D.Y., 2020).

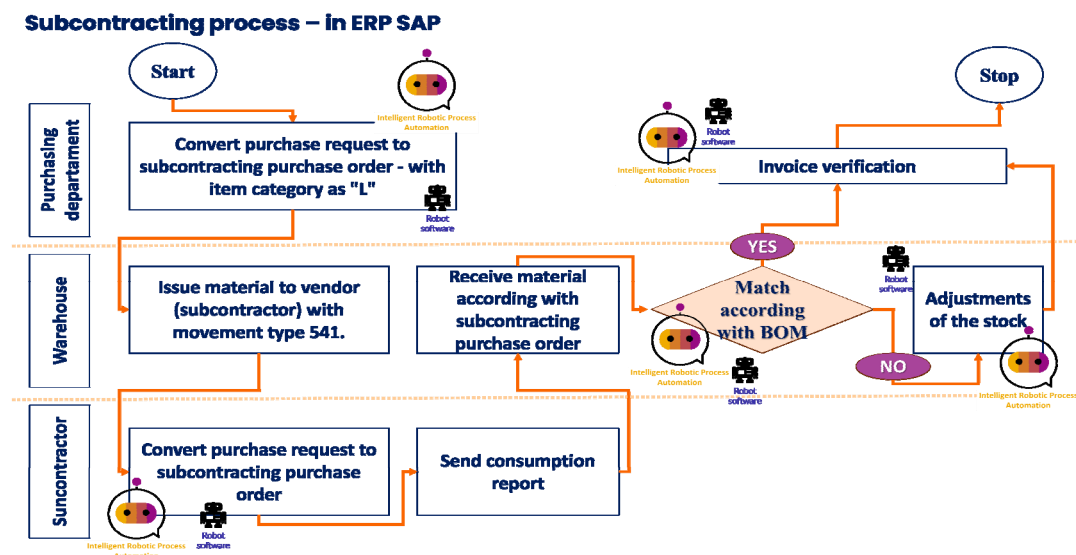


Figure no. 2 – The SAP sunbcontracting process using intelligent Robotic Process Automation

4. RESULTS

The use of software robots for automating business processes in companies that have integrated intelligent work solutions is becoming more and more in demand and utilized every day, the most demanded and used intelligent solution based on AI (artificial intelligence). So, this case study is based on the modeling of an economic process, in this case subcontracting in SAP and is already live at a company that operates in the work area of turning waste into resources. The company is a leader in this business segment in Europe with work centers in Romania, Slovakia and Lithuania. Schematically the use of software robots was realized using the SAP BTP platform and some steps are highlighted

in figure 3. It started from connecting the SAP system to SAP BTP and a first step was to use credentials, in this case a common system user. All the steps that have been performed by a user have been stored, the software robot will have to do some steps by itself, as shown in Figure 2, we are discussing the automatic creation of the purchase order using item category type "L", i.e. those related to SAP transactions MM01(create material - extend), ME11 (create info record - info category "Subcontracting"), CS01 - create material BOM (using usage BOM - "Production"), MMBE (display stock), MIGO - Goods issue Order, ME51N - create purchase requisition, ME21N - create purchase order, ME2O - Subcontracting Stock Monitoring for Supplier. All these SAP transactions are part of the subcontracting process. In the present case study, the created software robot, i.e. the adoption and adaptation of intelligent technologies was activated in the steps related to converting the purchase order into an order having the assigned type - item category "L". Another step done by the created software robot was to convert purchase request to subcontracting purchase order. After the materials were sent to the subcontractor - there some transformations were applied to them, from color to shape, our robot performed match according with BOM, if everything was ok it automatically uploaded (an excel file with invoice data was received by e-mail, which it then uploaded into SAP). If there were no correlations between the data, it made a stock change, but it needed a confirmation from the warehouse employees. Finally he would send an e-mail to the procurement, warehouse and subcontractor.

Subcontracting software robot

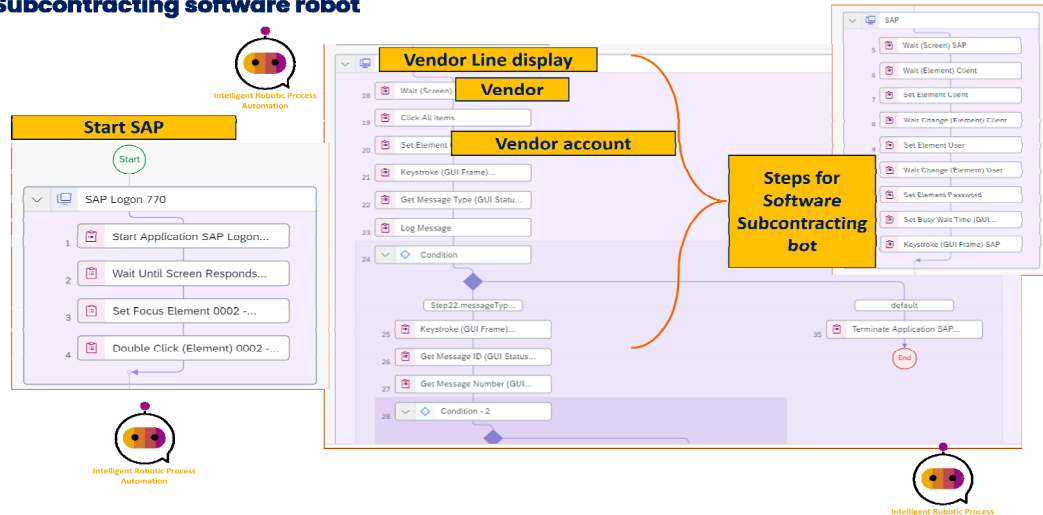


Figure no. 3 – Overview of some existing steps in the software robot created for the subcontracting process

5. CONCLUSIONS

Companies that have integrated ERP system as a core software - in our case we are talking about SAP - but not only SAP, are increasingly choosing to adopt and adapt intelligent software solutions to make their work easier, knowing that such intelligent integrated applications are designed to eliminate a number of disadvantages encountered extremely often in recent years, from data entry mistakes, time wasted on data/document checks, automated document processing, hard way to adapt new employees to what they have to do every day, increased efficiency (a software robot works non-stop).

Implementing iRPA or RPA in companies has brought a major competitive advantage, in the process discussed in this case study the relationship between what the company had to send to subcontractors is now done very smoothly and seamlessly. The company discussed in this paper has invested heavily in smart technologies in recent years, with discussions of remodeling existing business processes leading to a more than 50% overrun in all that is involved in adapting and adopting smart software solutions.

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