Issues of the Implementation of ERP in Manufacturing Companies

Nike Vrecl, Simona Sternad Zabukovšek
University of Maribor, Faculty of Economics and Business, Maribor, Slovenia
nike.vrecl@student.um.si, simona.sternad@um.si

Abstract An enterprise resource planning (ERP) solution is a system that combines business functions with the management and organization of data and information. Its purpose is to facilitate the flow of information between all business functions within an organization and to manage the organization's connections with external stakeholders. Proper information management helps an organization to connect organizational units, which further encourages the process of communication and the immediate exchange of information between members of the organization, thus leading to improved organizational processes and better decision-making at all levels. It is important to be aware of the complexity of implementing an ERP solution. Without the support of top management, a proper business plan and vision, business process transformation, effective project management, user involvement, and education and training, organizations cannot reap the full benefits of such a complex system. For implementation to be successful, it is crucial to consider the critical success factors. Identifying these factors is important as it allows companies successfully implement an appropriate ERP solution. The purpose of this study is to discuss the implementation of ERP solutions in the manufacturing industry. The manufacturing industry has discovered the effectiveness of ERP, however, it also faces some challenges in its implementation.

Keywords:
ERP, implementation, critical success factors, manufacture, companies

University of Maribor Press

DOI https://doi.org/10.18690/um.epf.5.2022.33
ISBN 978-961-286-600-6

1 Introduction

Enterprise Reseurce Planning (ERP) solutions have a diverse range of powerful and scalable features. Among other things, they can be used to create and maintain a large database that allows different departments to collaborate with real-time synchronisation. By computerising workflows, managing information and providing real-world insights into ERP solutions, they simultaneously increase productivity, reduce potential errors and ultimately promote higher profitability. ERP solutions are great for reducing costs, and by improving collaboration they can significantly increase efficiency, leading to high-quality services and enabling a company to stay competitive (Matendea & Ogaob, 2013).

Today, many public and private organisations around the world are implementing ERP solutions to replace outdated information systems that are no longer compatible with the modern business environment. However, the transition process is a difficult and challenging one. Additionally, the transition to an ERP solution requires training, the development of new procedures and data conversion. The introduction is very beneficial for companies, therefore it is crucial that it is carried out properly. It is important to be aware of and understand the critical success factors in implementing ERP solutions. Critical success factors are those variables or circumstances that are necessary for a positive result of the implementation of an ERP solution. Identifying these factors is important as it allows companies to focus their efforts on building their capacity to meet the critical success factors and consequently successfully implement an appropriate ERP solution.

Understanding the critical success factors in deploying ERP solutions is a challenge for many organisations around the world. An ERP solution enables an organisation to integrate all its primary business processes, thus increasing efficiency and maintaining a competitive position. However, if an ERP solution is not successfully implemented, the anticipated benefits of improved productivity and a competitive advantage may not materialise. For manufacturing companies, an ERP system can solve many challenges and deliver valuable benefits, such as cost reduction, streamlining processes, managing growth and gaining a competitive advantage, therefore it is important to find the right solution and consider the critical success factors during implementation.

There are many studies on success factors in managing ERP solution projects. The results vary according to the participants, the scope of study and the industry. However, some recurring factors seem to play a key role regardless of the context of the project. In the following section, the authors of this paper have described ERP solutions and their functionalities. Later, they provide an overview of the implementation of an ERP solution and the critical success factors for its implementation. They also elaborate on the importance of implementing ERP solutions in manufacturing companies.

2 ERP solutions

Companies use ERP solutions to manage and integrate important parts of their business. Many ERP solutions are important to businesses because they help them plan resources by integrating all the processes needed to run their businesses into a single system. ERP solutions offer a unified system solution that integrate enterprise-wide processes. Such solutions allow users to interact within a single interface, share information and collaborate with each other (Anderson, 2022).

ERP solutions are designed around a single, defined data structure (schema), which usually has a common database. These fundamental constructs are then interconnected by business processes driven by workflows between business departments, connectivity systems and the people who use them. Simply put, an ERP solution is an information solution for connecting people, business processes and technologies in a modern company. The solutions also ensure that these data fields and attributes are displayed on the correct accounts in the company's general ledger, so that all costs are properly monitored and presented. A key principle of an ERP solution is central data collection for wide distribution. Instead of multiple standalone databases with an endless list of unrelated spreadsheets, ERP solutions bring order to chaos, so that all users can create, store and use the same data obtained through shared processes. With a secure and centralised data warehouse, everyone in the organisation can be sure that the data is correct, up-to-date and complete (Oracle, 2022).

ERP solutions are defined as information solutions with the ability to provide an integrated set of business applications. They have a common process and data model that encompasses comprehensive business processes at the operational level, such as those found in finance, human resources, distribution, manufacturing, services and the supply chain. ERP solutions automate and support a range of administrative and operational business processes across multiple industries, including business areas, customer-centric aspects, administrative aspects, and enterprise asset management aspects (Gartner, 2022).

ERP solutions can be divided by installation or size. Modern ERP solutions can be installed in several ways: in a public or private Cloud, on-premise, or in various hybrid scenarios. ERP solutions are not just for leading global companies; they are designed for companies of all sizes - large, medium and small companies (see Table 1 for an example). Industry- and company-specific functionalities can also be chosen to meet unique business needs.

Table 1: Leading global providers by company size

Large companies	**Medium companies**	**Small companies**
SAP	NetSuite	Deltek
Oracle	Sage	Acumatica
Microsoft	Infor	Syspro

Data source: (Advice, 2022)

ERP solutions offer many functionalities for companies trying to improve business efficiency. Providers of these solutions are constantly updating their solutions to offer the fastest and most reliable services. As the name suggests, the main goal of an ERP solution is to manage the various sources of ERP within a company to ensure their cost-efficiency. They are also designed to use all resources efficiently. These solutions work especially well for tracking and managing data, such as a company's capacity for production, inventory, purchasing, sales, finance, payroll information, purchase orders and more (Davidson, 2021).

3 Implementation of ERP solutions and the critical success factors in their implementation

Companies often learn about ERP solutions early on, however, due to their rapid growth, they have little time to buy upgrades. Companies that are in the process of choosing an ERP solution must pay special attention to ensure that it covers as many aspects of the business as possible. In the research process, it is important to calculate the cost and time of deployment for each location, branch or building and to consider whether some branches may need a less powerful regional ERP solution in addition to the parent company's software. It is also necessary to bear in mind that the implementation of an ERP solution throughout the company requires training in all departments. Small- and medium-sized enterprises (SMEs) can benefit greatly from an ERP solution that streamlines processes from delivery to sales and reduces the overall cost of the software. As with many other things in the market, it is important to weigh up pricing models in terms of features and potential return on investment. Cloud subscription solutions (Software as a Service; SaaS) have become established in the market in recent years, which is great news for SMEs that cannot justify the one-off cost of a standalone software licence. For SMEs, it would be wise to ensure that the ERP solution they contract is usable and friendly to as many departments as possible. However, these companies may not need as broad a coverage as larger companies (Advice, 2022).

The deployment of ERP solutions is usually divided into six main phases, which can take several months or in some cases even years. The process must begin before deciding which solution to buy, and continue even after the introduction of the selected ERP solution. These phases may overlap and vary slightly depending on the solution provider. In general, however, companies will follow the following six phases, which are described in more detail below (Caldwell, 2020).

The main factors that were revealed as a result of the literature review, and which were found to be key to the successful implementation of an ERP solution are (Sternad Zabukovšek, Tominc, Štrukelj, & Bobek, 2020): management support; project management; employee involvement; clearly defined scope of the project; business process optimisation plan; existing platforms, systems and data.

Management support – It is important that management agrees with the ERP solution project. Projects are successful if they work on the basis of a single set of facts with the data is stored in a single database. This provides the company and its customers with the same view of the state of the project (Sunrise Technologies, 2022).

Project management – Project management includes planning, organisation, scheduling, resource provision and schedules that determine the beginning and end of deployment. The project manager sets up a project team for structure and control, which is in charge of running the project plans (Dunaway, 2022).

Employee involvement – The ERP deployment team must be made up of the best employees from across the organisation; people who know the current processes down to the final detail. These internal resources must be able to understand the general needs of the company and must be entrusted with key responsibilities and decision-making powers. The introduction of ERP solutions is changing the way people work and no one likes change in principle. It is important to provide enough time to train people on how to use new solutions and procedures (Sunrise Technologies, 2022).

Clearly defined project scope – A well-defined and written scope of work can mean the difference between a failed project with disastrous results and a very successful project with great benefits. The scope of the project is the basis for the project requirements and the resources to be used (Sunrise Technologies, 2022).

Business process optimisation plan – One of the most expensive aspects of deployment is customisation. Funding sources need to be well developed to avoid major financial difficulties along the way. A contingency plan should be prepared to address deficiencies or budget overruns to minimise project timetables and logistics. Budget overruns are certainly more than an exception to the rule. Most budget overruns are due to unforeseen or underestimated fees, staffing or technical problems. If companies evaluate these problems and prepare for any unforeseen measures prior to introducing an ERP solution, the costs and duration of the project can be reduced (Sunrise Technologies, 2022).

Existing platforms, systems, and data – The company's existing platforms, systems and data are the lifeline for implementing an ERP solution. The implementation strategy must address how the environment of the older system will be handled in conjunction with the new ERP solution. The data may need to be converted for use in an ERP solution, it may be necessary to develop interfaces for linking data from an older system, and to set configuration rules for operational transaction processing. Switching from existing systems can be one of the most difficult challenges in deploying ERP solutions. High detail, thorough planning and careful implementation are required to ensure a smooth transition of the systems (Dunaway, 2022).

4 Implementation of erp solutions in manufacturing companies

ERP systems for manufacturing companies, whether discrete or continuous, bring business processes together with technology. Manufacturing companies have traditionally operated by focusing on the following integrals (Whitehouse, 2021):

- ERP software for manufacturing companies
- product data management
- design, planning, and implementation
- automatic data collection
- compliance management
- lean processing
- total quality management
- advanced planning and design
- product lifecycle management

Businesses can gain control over all these aspects to optimise their performance. Simply put, ERP solutions help companies to grow proactively by bridging the gaps from customers to suppliers and from suppliers to employees (Whitehouse, 2021).

Among the major reasons that manufacturers invest in ERP solutions is to leverage more data, manage critical aspects of the manufacturing process, utilise resources effectively, and make stronger strategic decisions. There are many different types of manufacturing ERP solutions available on the market, however, most of them

include a core set of features that support front-office, back-office, and shop floor operations, including (Picard, 2021):

- order management
- inventory management
- customer relationship management
- warehouse management
- supply chain management
- finance and accounting

Manufacturing companies are looking for standalone solutions that can be used to retrieve data anytime, anywhere, with full scalability and without burdening internal resources. They are looking for ways to control risk by assessing critical data without affecting their freedom to adapt. They are extending their requirements to their users' handheld devices. They are looking for business intelligence. Companies want to provide a platform that enables closer integration between customers and suppliers and the production process. Manufacturing operations are more profitable with ERP solutions. When a manufacturing company is looking to increase its return on investment (RoI) and is looking to transform its business, upgrade its processes and assess its readiness to adapt to change, it is the optimal time to consider implementation of an ERP solution (Whitehouse, 2021).

According to Khan & Anwar (2019), the most important critical success factors for the implementation of ERP soluctions in manufacturing companies are: top management support and commitment; business process re-engineering; effective internal and external communication; employees and stakeholder participation; performance monitoring, evaluation and feedback; competency of project teams and the balanced use of external and internal consultants; a well defined project budget; an empowered decision-making, reward, recognition and motivation system; trust and cooperation between partners; organisational structure; steering committee; business discipline; rules, norms and values; project management; change management and others.

5 Conclusion

Organisations are implementing ERP solutions to adapt to today's demanding and competitive business environment and to achieve the ability to plan and integrate enterprise-wide resources, thus shortening lead times and better responding to customer requirements. An ERP solution refers to an information system used to design and manage all key processes of the supply chain, production, services, financial and other processes of an organisation. ERP solutions can be used to automate and simplify individual activities in a company or organisation, such as accounting and purchasing, project management, customer relationship management, risk management, compliance and supply chain operation. Providers may offer a software-as-a-service (SaaS), while some offer locally installed solutions or hybrids.

ERP solutions can be used to efficiently communicate and integrate business processes to enable data flow between applications, typically through shared on-premises or Cloud databases. ERP solutions effectively support business processes if properly implemented. Failure to implement ERP is common, therefore it is important to be aware of the importance of the critical success factors. Some of the identified factors are a lack of support from the top management of the organisation, clear project definition, inefficient user training, lack of a qualified project team, lack of effective communication, an unclear business plan and vision, a lack of detailed project planning, and lack of effective change management process.

This aim of this study was to identify the functionalities, challenges and business functions of ERP solutions in the manufacturing industry. The authors found that in order to achieve their goals, manufacturing companies needs to upgrade their information technology to improve their productivity. The critical success factors identified above form the basis for determining the effectiveness of the implementation of ERP solutions in manufacturing companies and provide guidance for further improvements. In addition, the analysis shows that the adoption of an ERP solution is effective in automating overall business processes and improves productivity and performance in the manufacturing industry.

References

Advice, T. (2022). *Enterprise Resource Planning Software Buyer's Guide*. Retrieved March 19, 2022, from TechnologyAdvice: https://technologyadvice.com/erp/.

Anderson, S. (2022). *Enterprise Resource Planning*. Retrieved March 17, 2022, from Investopedia.

Caldwell, A. (2020). *4 Key ERP Implementation Strategies*. Retrieved March 17, 2022, from NetSuite: https://www.netsuite.com/portal/resource/articles/erp/erp-implementation-strategies.shtml.

Davidson, R. (2021). *10 Most Popular ERP Features Key Capabilities and Benefits*. Retrieved March 17, 2022, from SoftwareConnect: https://softwareconnect.com/erp/10-most-popular-erp-features/.

Dunaway, M. M. (2022). ERP Implementation Methodologies and Strategies. *Readings on Enterprise Resource Planning*, 46-58.

Gartner. (2022). *Enterprise Resource Planning (ERP)*. Retrieved March 16, 2022, from Gartner: https://www.gartner.com/en/information-technology/glossary/enterprise-resource-planning-erp.

Khan, S. H., & Anwar, M. (2019). Analysis of Critical Success Factors (CSFs) for Implementation of Enterprise Resource Planning (ERP) in Manufacturing Industry. *International Journal of Scientific & Engineering Research*, 392-402.

Matendea, S., & Ogaob, P. (2013). Enterprise Resource Planning (ERP) System Implementation: A Case for User Participation. *Procedia Technology*, 518-526.

Oracle. (2022). *Definition of enterprise resource planning (ERP)*. Retrieved March 16, 2022, from Oracle: https://www.oracle.com/erp/what-is-erp/.

Picard, A. (2021). *Manufacturing ERP: Everything Your Business Needs To Know*. Retrieved March 20, 2022, from Aptean: https://www.aptean.com/en-AU/insights/blog/manufacturing-erp-everything-you-need-to-know.

Sternad Zabukovšek, S., Tominc, P., Štrukelj, T., & Bobek, S. (2020). *Digitalna transformacija in poslovne informacijske rešitve*. Maribor: Pearson Education.

Sunrise Technologies. (2022). *7 Critical Success Factors for Successful ERP Implementation*. Retrieved March 18, 2022, from Sunrise Technologies: https://sunrise.co/blog/successful-erp-implementation/.

Whitehouse, S. (2021). *ERP Systems for Manufacturing Companies*. Retrieved March 19, 2022, from WinMan: https://www.winman.com/blog/bid/304660/erp-systems-for-manufacturing-companies.