

ERP IMPLEMENTATION AND PROJECT SUCCESS

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Purpose: The purpose of this paper is to evaluate the impact of the implementation of an ERP system on the success of projects in a selected company operating in the mechanical engineering industry. Here, project success is referred to both the fulfilment of the constraint triangle criteria and the satisfaction of stakeholders - customers and project team members.

Design/methodology/approach: The research was carried out using desk research and 2 survey questionnaires addressed to different groups of respondents: project team members and clients. The desk research study analysed 96 projects carried out by the company, while 34 clients and 32 project team members took part in the survey.

Findings: According to the research, the implementation of the ERP system significantly influenced the triangle of constraints and the fulfilment of the two success criteria considered most important in the analysed entity, i.e. compliance with the budget and the project schedule. Moreover, it was found that customer satisfaction with the products and services offered by the selected company increased under the implementation of the system, and project team members themselves considered that the system allowed them to improve their work in projects.

Originality/value: The paper presents an assessment of project success from the perspective of the implementation of an ERP system into company operations, including project activities.

Keywords: project success, project triangle, ERP system, project teams.

Category of the paper: research paper, case study.

1. Introduction

Today's business environment, which is characterised by dynamic change and competitiveness, especially for companies in the industrial sector, means that they must constantly strive to improve their processes and increase the efficiency of their operations. This enables them to offer attractive prices to customers and shorter lead times for projects. One of the key actions in this respect is also the implementation of an ERP system. In fact, it can be said that ERP systems are currently the bare minimum for companies wishing

to computerise and automate their business processes (Fajfer, 2011). And what's more, the development of software implemented in a company has a pretty good impact on the company (Supriyono and Sutiah 2020). For this reason, a strong trend can be observed nowadays, whereby more and more companies decide to implement this type of system.

An enterprise resource planning (ERP) systems is an information systems (IS) that simultaneously integrates and supports multiple areas of business operations, including planning, sales, production (Jessup, Valacich, 2006) or project execution. These systems integrate business functions into unified platforms for automation and analysis (Kunduru, 2023), making it possible to collect and store data from different departments and locations through a standardized user interface (Al-Okaily et al., 2023; Ouiddad et al., 2020; Al-Jabri, 2015).

The implementation of an ERP system is a very complex process, as many factors, both internal and external, influence the implementation (Ahmad, Pinedo-Cuenca, 2013). An enterprise system like an ERP usually requires several years of implementation and post-implementation before becoming part of the company (Al-Mashari et al., 2003). An ERP system supports tactical movements and strategic direction in enterprises, but its implementation requires management and implementers to have a broad understanding of ERP architecture and the specific components that may be required for each business need (Amini, Abukari, 2020). An effectively incorporated ERP system can improve operational efficiency by backing up a firm's business processes and gain competitive advantages by allowing innovative practices (Al-Mashari et al., 2003).

Indeed, the adoption of ERP systems has become a global phenomenon. The ERP systems market grew at a rate of 14% in 2004, reaching a global value of \$23.6 billion (Chen et al., 2009). What's more, according to the Panorama Consulting Group's 2022 report, more than 80% of companies surveyed met their return on investment expectations for an ERP system (Panorama Consulting Group 2022). It is therefore worth considering what impact the implementation of an ERP system will have on the success of projects implemented in enterprises. Therefore, the aim of the paper was to assess the impact of the implementation of an ERP system on the success of projects carried out in the surveyed enterprises. The research was conducted using the desk research method comparing the results of projects before and after the implementation of the ERP class system in the period 2020-2023 and using 2 survey questionnaires. The survey was addressed to different groups of respondents: project team members and customers. In the case of project team members, the impact of the ERP implementation on their work in the project team was analysed, while with regard to customers, their satisfaction with the cooperation with the surveyed company in the implementation of individual projects was investigated.

The paper is organised as follows. The first part describes ERP class systems and its implementation process. The second part describes the project success and its criteria. Chapter 3 describes the methodology of empirical research. The results are presented in Chapter 4, and the Discussion in Chapter 5. The summary includes theoretical and practical implications.

2. Theoretical background

Definition and implementation of ERP systems

In order to understand the essence of ERP systems, it is worth quoting the various definitions of the concept proposed by theorists and practitioners. Davenport (2002) defines an ERP system as "a commercial software package that enables the integration of all information flowing through an enterprise related to finance, accounting, human resources, supply chain and customers". Deloitte, in its report 'ERP's Second Wave', defines this tool as "a business software package that enables an enterprise to: automate and integrate most of its business processes, share data and operating procedures across the enterprise, produce information and access it in real time" (Deloitte Consulting, 1998). This definition is strongly linked to the concept of information and also to the set of information characteristics necessary to manage it effectively. In contrast, Klaus et al. (2000) describe ERP as "a software package for integrating all business functions and processes of an enterprise and providing a homogeneous information and computer architecture for managing the entire company". What emerges here is an acknowledgement of the importance of ERP systems as those capable of supporting the management of the entire enterprise. Kale (2001), when defining this term, uses the term "a ready- to-implement integrated set of modules (applications) supporting all business functions of the enterprise and having the possibility of dynamic configuration. It enables enterprises to process real-time data in an integrated, process-oriented and information-driven environment". In turn, Ahmadzadehet al. (2021) and Tavana et al. (2020) pointed out that ERP facilitates the production of various tangible and intangible benefits via the integration of best business practices, leading to improvements in productivity and production of profit.

Due to the continuous evolution of IT management systems, the increasing number of options available both in terms of the application provider and companies implementing ERP systems, and taking into account the unique needs of enterprises, it is not possible to develop step-by-step instructions for the implementation of this type of software (Nagpal et al., 2015). However, a number of frameworks and models have emerged that define how an ERP implementation should proceed. These have been defined both by authors of scientific and industry publications, software manufacturers and companies involved in the implementation of management support systems in enterprises. The models developed in the literature are presented in Table 1.

Table 1.
Models of ERP implementation stages and their authors.

Author(s)	Steps in the implementation of ERP systems
N. Bancroft, H. Seip, A. Sprengel	<ol style="list-style-type: none"> 1. Focus, 2. Creating the current image, 3. Creating a target vision, 4. Construction and testing, 5. Implementation.
M. Makipaa	<ol style="list-style-type: none"> 1. Initiative, 2. Evaluation, 3. Choice (solution), 4. Modification, process re-engineering and data conversion, 5. User training, 6. Go-Live, 7. Completion, 8. Maintenance and development.
A. Parr, G. Shanks	<ol style="list-style-type: none"> 1. Planning, 2. Project configuration, 3. Reengineering, 4. Development of the project concept, 5. Construction and testing, 6. Implementation, 7. Upgrading.
J.W. Ross, M.R. Vitale	<ol style="list-style-type: none"> 1. Concept development, 2. Implementation, 3. Stabilisation, 4. Continuous improvement, 5. Transformation.

Source: Nagpal et al., 2015; Seip, Sprengel, 1998; Makipaa, 2003; Parr, Shanks, 2000; Ross, Vitale 2000.

From the table above, it can be seen that the approaches proposed by the different authors differ profoundly from each other. These differences manifest themselves not only in the number and naming of the stages, but also in the order or level of detail to which the stages are reduced.

As the leading producers of IT management systems became established in the market, they began to develop their own implementation frameworks to make it easier for companies to implement their software. There are three leading methodologies for implementing ERP systems, developed successively by SAP, Oracle and Microsoft (Nagpal et al., 2015). A comparison of ERP implementation stages according to these methodologies is presented in Table 2.

Table 2.
Methodologies of ERP implementation

Methodologies		
Accelerated SPA	Oracle Unified Method (OUM)	Microsoft Dynamics Sure Step
Project preparation - includes defining the project, identifying and specifying the scope of implementation, outlining the implementation strategy, laying out the implementation schedule, defining the implementation objectives, defining the steering committee and allocating resources	Commencement - key stage, implies a clear definition of implementation objectives by all stakeholders, setting the scope of implementation with requirements and main risk factors	Diagnosis - this stage includes a review of the organisation's requirements for an ERP system, an overview of the computer infrastructure, a preliminary concept for the solution is proposed, and a budget and implementation schedule are determined
Creation of a business plan - involves the creation of an input database for system configuration, includes requirements specification, documentation of business processes and documentation of organisational structures	Development - the scope developed in the previous phase is broken down into individual requirements to which solutions are selected. A system, concept is created as the basis for the construction phase	Analysis - the organisation and its processes are modelled and documented, specific activities are determined, work is planned, data on the organisation's business needs is collected. A gap-fit document is created, which lists the individual requirements, depending on whether they are included in the base version of the system or whether it needs to be adapted
System configuration - involves configuring the system to suit the needs of the organisation, according to the data that was obtained as a result of the previous phase. This phase requires complex testing	Construction - in this phase, the base version of the system, together with the concept, is adapted to the specified requirements and also tested. A beta version of the system is prepared for customer approval	Design - at this stage, it is determined how each requirement will be implemented in the target solution, the required modifications to the base system are designed and data migration templates are established
Final preparation - involves final testing of the system and training of end users. In this phase, a version of the software is created that will be used at the time of implementation	Transition - this phase, through systematic beta testing, prepares the system for final customer approval and subsequent implementation in the organisation	Construction - the aim of this stage is to create and test the individual functionalities defined in the previous stage, followed by the installation of the system on the organisation's infrastructure
Implementation and post-implementation support - in this phase, there is a full implementation of the new system and a cutover of the previously used software. The amount of support needed by users begins to gradually decrease	Operation - in this phase, post-implementation support is implemented and the operation of the system is gradually transferred to the resources of the organisation	Commissioning - at this stage, the ERP system, becomes operational in the organisation, end-user training and final testing is carried out
		Operation - in this phase, post-implementation support is implemented and the operation of the system is gradually transferred to the resources of the organisation

Source: own work based on (Nagpal et al., 2015; Microsoft Corporation).

As can be seen from the table above, just as in the case of the models proposed by various authors (Table 1), the number of stages and their scope differ. It should also be mentioned that, in addition to the methodologies presented above, one can also encounter methodologies developed by companies involved in the implementation of ERP systems and dedicated methodologies, where stages, processes and tools are defined individually for a given implementation.

Project success and evaluation criteria

Definitions of project success developed in the literature and in project management standards contain many points in common. Karbownik describes project success as "the realisation within the agreed deadline and within the planned budget, with the achievement of the project objectives and with the satisfaction of the recipient regarding the quality of the project results and the degree of satisfaction of its business objectives" (Karbownik, 2017). Trocki defines project success as "the successful outcome of a project" and emphasises that, in addition to the project's compliance with the constraints triangle, the focus should also be on the needs of the customer when determining its success (Trocki, 2012). In the PMBoK standard, success is defined as a measure of the achievement of the project's benefits in relation to its objectives. It is emphasised that the end result of a project is often not known at the end of the project, but only after some time (PMBoK, 2019).

Based on the above-mentioned definitions and an analysis of other (Spalek, 2004) project management publications, the following elements of project success can be distinguished (Chauhan et al., 2011):

- **compliance with the triangle of constraints** - the project completed within the intended timeframe, within budget and met the agreed scope,
- **compliance with customer requirements** - the final product of the project meets the customer's requirements,
- **satisfaction of other stakeholders** - project stakeholders, both internal and external to the project company, are satisfied with the project and the changes brought about by its implementation.

The definition and perception of project success has evolved with the development of the project management discipline (Table 3).

Table 3.
Criteria and success factors over the decades

	1960s-70s	1980-2000	The 21st century
Criteria for success	The iron triangle (time, cost, scope)	Iron triangle Customer satisfaction Benefits for the organisation End-user satisfaction Benefits for stakeholders Benefits for project staff	Iron triangle Strategic goals of the client organisation and operational success Satisfaction of end users Benefits for stakeholders Benefits for project staff Symbolic and rhetorical evaluation of success and failure criteria
Success factors	A cursory list	Lists and structures of critical success factors (CSF)	A more global CSF structure and symbolic and rhetorical success factors
Focus area	Successful project management	Success of the project and its outcome/product	Project, product, programme and portfolio success; narrative of success and failure

Source: Urbanelis, 2014; Ika, 2009.

Karbownik points out that for each project, the manager, together with the project team, should work out together a definition of project success by answering the questions (Karbownik, 2017):

- a) "what are the attributes of a successful project from the point of view of the team and what are the attributes of a successful project from the point of view of the project recipient?"
- b) are we aware of the obstacles to success, i.e. can we identify the so-called critical success factors of the project?"
- c) do all members of the project team have a full understanding of the critical success factors of the project?"

The concept of project success is complex and variable, as its definition evolves with the development of the project management field. Project stakeholders have different perceptions of success, depending on their individual project goals and expectations. It is important to define project success at the beginning of a project in order to have clear and unambiguous criteria to guide the evaluation of the outcome.

Taking into account the above considerations, the following research questions were formulated in the paper:

- RD1: How has the implementation of the ERP system affected the compliance of the implemented projects with the assumed budget and schedule?
- RD2: How did the implementation of the ERP system improve project management in the company under review?
- RD3: How has the implementation of the ERP system affected the satisfaction of project team members and the company's customers?

3. Methods

In order to investigate the satisfaction of project stakeholders and to analyse the impact of the ERP system on their satisfaction, a diagnostic survey method was used and a survey questionnaire tool was applied. Two types of questionnaires were used - the first, aimed at project team members, and the second, aimed at customers of the analysed entity. A satisfaction survey of project team members was conducted among the employees of the selected company, who regularly use the ERP system implemented in the company during project implementation. As of 6 May 2023, the number of people meeting this criterion was 40. These people received an invitation to participate in the survey by email. The survey itself was prepared electronically, using the Google Forms tool. The survey used a 5-point Likert scale (from '1' to '5', where '1' meant strongly disagree and '5' meant strongly agree).

The second survey, examining customer satisfaction, was handed over by the company, either electronically or on paper, after each completed project. Depending on the language of communication with the client, the survey was transmitted in Polish or English. In the survey, customers were asked to rate eight factors influencing their level of satisfaction, i.e.: quality of products and services, proposed prices for products and services, timeliness of deliveries, terms of payment, flexibility in relation to possible changes in the project, adherence to agreements, manner of communication - ease of contact and staff competence. Customers were also given the opportunity to include additional comments regarding their cooperation with the company. The survey adopted a 3-grade rating scale (where '1' meant bad and '3' meant good).

The desk research, on the other hand, was aimed at comparing the results of projects before and after the implementation of an ERP system. Here, a quantitative document analysis technique was used, analysing project documentation and reports (financial results and project schedules) for all projects implemented by the selected company between 2020 and 2023. The research used a nomenclature specific to the automotive industry, where project durations and milestone dates are given using consecutive weeks and week numbers, according to the European week numbering system (ISO 8601).

In the course of the study, the impact of the implementation of an ERP system was assessed in terms of two aspects: (1) the financial result (margin) obtained through the implemented projects, (2) the delay of the implemented projects. The following formula was used to calculate the margin:

$$\text{Margin} = \frac{\text{Project sales price} - \text{Project implementation costs}}{\text{Project sales price}}$$

The following formula was used to calculate the percentage project delay:

$$\text{Delay} = \frac{RZ - PZ}{PZ - P}$$

where:

P – project start date,

PZ – date of planned completion of the project,

RZ – date of actual completion of the project.

The project start date was considered to be the week in which the project initiation meeting was held. The end date of the project was considered to be the week in which the signature on the final project acceptance report was obtained.

The first part of the study analysed the overall financial and schedule performance of projects. In the second part, the results were evaluated by dividing the projects according to the method adopted and applicable in the selected company, i.e., by project value:

- small (usually modifications to existing machinery) - up to PLN 100,000 of project value,

- medium (individual machines) - from PLN 100,000 to PLN 500,000 of the project value,
- large (large machines or production lines) - more than PLN 500,000 of the project value.

Sample

Of the 40 people asked to participate in the satisfaction survey of project team members, a completed questionnaire was received from 32 people, representing 80%. The respondents included 27 men, four women and one person did not wish to disclose their gender. The largest age group was between 26 and 30 years old, with 37.5% of respondents. The respondents were highly experienced in their profession, with as many as 59.4% working in their profession for 6 years or more, as shown in Figure 1.

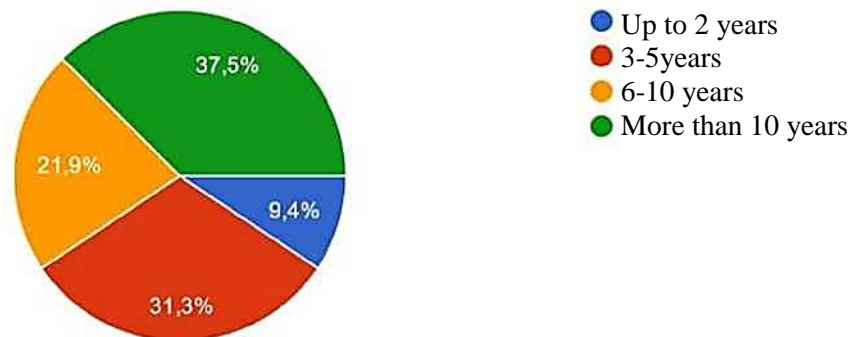


Figure 1. Structure of experience in the profession among respondents.

Source: own work.

The majority of the respondents were people with relatively long seniority in the company - as many as 71.9% of the respondents had seniority of 3 or more years. The largest group among the respondents were representatives of the automation department, with 25%. In second place were representatives from the design department, who accounted for 18.8% of the respondents, followed by respondents from the sales department (15.6%). The distribution of respondents by department is shown in Figure 2.

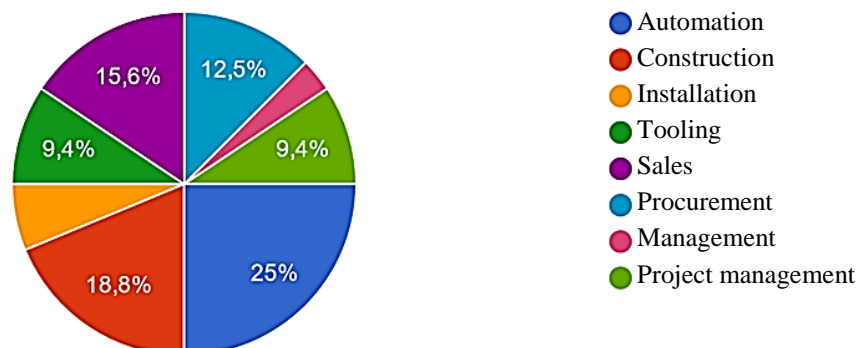


Figure 2. Structure of the departments in which respondents work.

Source: Own work.

Among the employees surveyed, 43.8% of respondents had worked with an ERP system before it was implemented in the company.

For the second survey, 34 completed questionnaires were received. The respondents were clients (customers) of the analysed projects implemented between 2020 and 2023. 12 of the responses received were for projects implemented using an ERP system, and 22 were for projects implemented prior to the implementation of the system. Among the respondents, 23 respondents represented Polish companies and the remaining respondents were customers from foreign companies, most of which came from the United States, Germany and Mexico. The distribution of respondents from each country is shown in Figure 3.

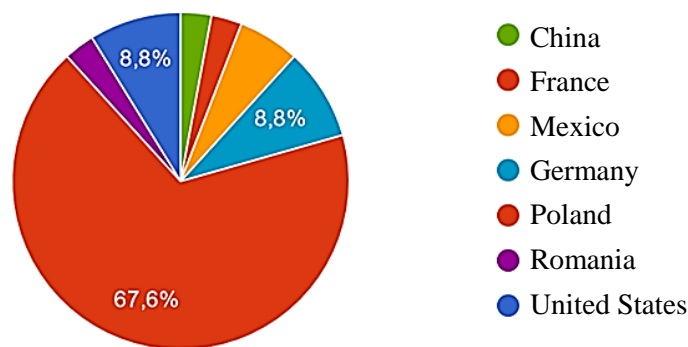


Figure 3. Structure of countries from which completed questionnaires were received.

Source: own work.

The desk research study, on the other hand, analysed 96 projects, with an average value of PLN 458k, a median of PLN 101k and an average actual duration of 22 weeks. 33 of the analysed projects were implemented using an ERP system. The analysed projects were classified as follows:

- 48 projects are small projects with an average value of PLN 33k, a median of PLN 25k and an average actual duration of 16 weeks,
- 25 projects are medium projects with an average value of PLN 278k, a median of £253k, and an average actual duration of 24 weeks.
- 23 are large projects, with an average value of PLN 1.55m, a median of PLN 1.3m, and an average actual duration of 33 weeks.

Results

The first part of the research, carried out using a 2 questionnaire survey, concerned the evaluation of the impact of the implementation of an ERP system on the work of project team members and customer satisfaction. With regard to the project team, the following results were obtained:

- B1: increased comfort with the system after implementation (mean score: 3.56),
- B2: improving the processes implemented by respondents during the projects (mean score: 3.56),

- B3: speed and intuitiveness of project data provision, resulting in decision support (mean score: 3.69),
- B4: facilitating participation in several projects simultaneously (mean score: 3.78),
- B5: improved information flow between project team members from the same departments (mean score: 3.5),
- B6: improved information flow between team members from different departments (mean score: 3.91),
- B7: facilitating access to archived data and support in drawing conclusions (mean score: 3.94),
- B8: reducing the risk of confusion and exposing the company to losses (mean score: 3.91),
- B9: greater optimality relative to the previous solution (mean score: 3.78).

One statement - B10: increasing the speed of task completion - received an average score of less than 3 (mean score: 2.94). This statement also received the highest dispersion among the responses, with a standard deviation of as much as 1.5. The distribution of responses to the above statements is shown in Figure 4.

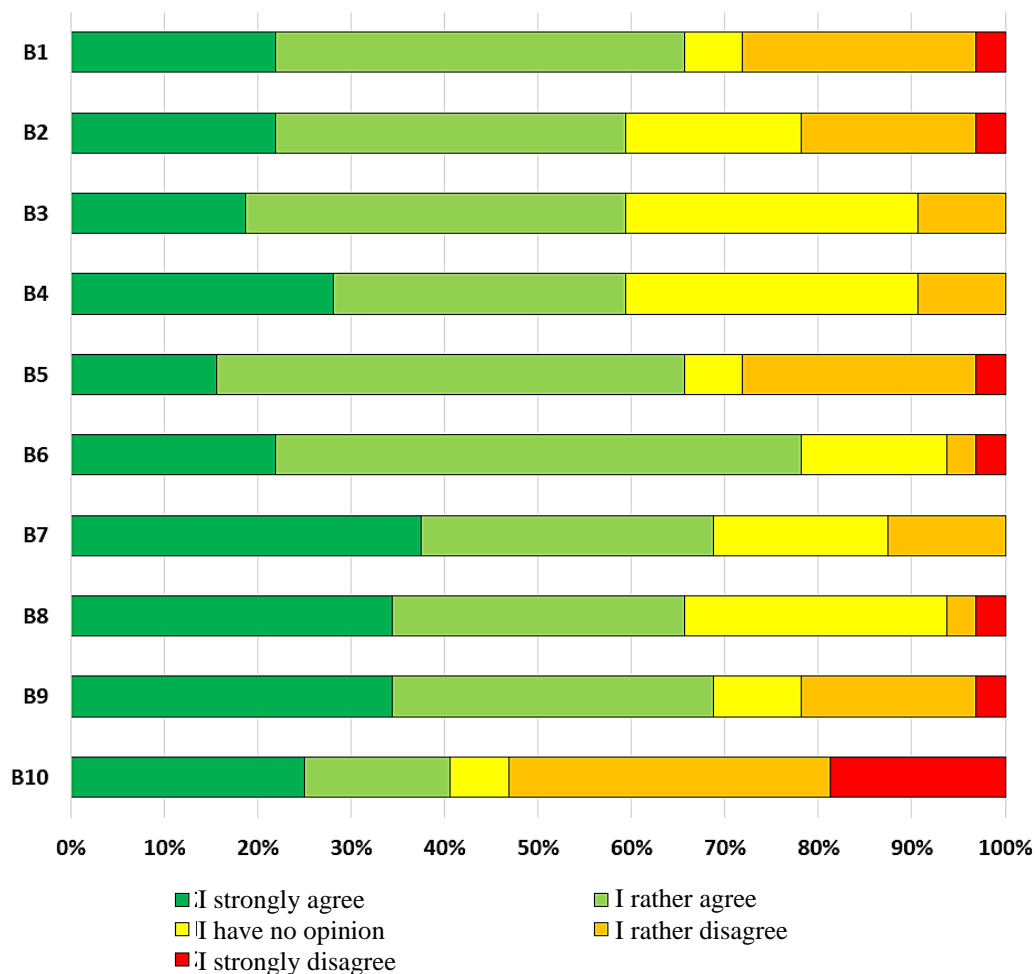


Figure 4. Impact of ERP implementation on the work of project teams.

Source: Own work.

Analysing, in turn, the impact of the implementation of an ERP system on the satisfaction of the selected company's customers, one can see a significant increase in the ratings for six of the eight factors, i.e.:

- customers rated the quality of the products and services offered by the selected company as having increased significantly after the implementation of the ERP system (mean score increased from 2.68 to 2.92),
- the prices offered by the selected company have become more affordable for customers (average score increased from 2.41 to 2.75),
- the timeliness of deliveries improved (average score increased from 2.50 to 2.67),
- the payment terms offered by the company have become more attractive (average score increased from 2.68 to 2.83),
- the company's flexibility in relation to possible changes to the project increased (mean score rose from 2.64 to 2.83),
- the ease of contact and communication with company representatives has improved (mean score increased from 2.64 to 2.92).

For two factors, ratings remained similar or declined:

- keeping to agreements (mean score changed from 2.91 to 2.92),
- staff competence (average score dropped from 3.0 to 2.92).

The assessment of timeliness of delivery was the one where respondents' evaluations varied the most. The standard deviation was 0.66 when assessing projects before ERP implementation and 0.47 for projects after implementation. The scores obtained are shown in Table 4.

Table 4.

Assessments of eight customer satisfaction factors for projects before and after ERP implementation

	Before implementation of the ERP system	After implementation of the ERP system
Quality of products/services	2.68	2.92
Proposed prices for products/services	2.41	2.75
Timeliness of deliveries	2.50	2.67
Payment terms	2.68	2.83
Flexibility in relation to possible changes in the project	2.64	2.83
Keeping to agreements	2.91	2.92
Mode of communication - ease of contact	2.64	2.92
Staff competence	3.00	2.92

Source: own work.

To summarise the first part of the research, it can be concluded that project team members positively assessed the impact of the ERP system implementation on their project job satisfaction. It is also noticeable that the satisfaction of the selected company's customers with the products and services offered increased after the implementation of the system.

The second part of the research, carried out using the desk research method, compares project performance (in terms of time and budget) before and after the implementation of ERP systems. The projects - small, medium and large - followed the criteria outlined in the earlier subsections.

Of the 48 projects that were categorised as small, 37 were implemented using an ERP system and 11 without. Guided by the parameters outlined above, the following results were obtained (Table 5):

- The total gain of projects completed without an ERP system was 37.86% and the average gain was 44.73%. The average duration of these projects was 17.4 weeks and the average delay was 44%.
- The total profit of projects completed using the ERP system was 51.95% and the average profit was 49.38%. The average duration of these projects was 10 weeks and the average delay was 11%.

Table 5.

Financial performance and schedule compliance of projects classified as small

	Number of projects	Small projects			
		Financial result		Duration	
		Total profit	Average profit	Average duration (weeks)	Average delay
Implemented without using an ERP system	37	37.98%	44.73%	17.4	44%
Implemented using an ERP system	11	51.95%	49.38%	10	11%

Source: own work.

Of the 25 projects that were categorised as medium, 17 were implemented using an ERP system and eight without. The following results were obtained here (Table 6):

- the total gain of projects completed without the use of an ERP system was 13.97% and the average gain was 12.34%. The average duration of these projects was 22 weeks and the average delay was 17%.
- the total profit of the projects implemented using the ERP system was 24.93% and the average profit was 30.16%. The average duration of these projects was 21 weeks and the average delay was 13%.

Table 6.

Financial performance and schedule compliance of projects classified as medium

	Number of projects	Medium-sized projects			
		Financial result		Duration	
		Total profit	Average profit	Average duration (weeks)	Average delay
Implemented without using an ERP system	17	13.97%	12.34%	22	17%
Implemented using an ERP system	8	24.93%	30.16%	21	13%

Source: own work.

Of the 23 projects that were categorised as medium, nine were implemented using an ERP system and 14 without. In this case, the following results were obtained (Table 7):

- the total gain of projects completed without the use of an ERP system was 6.46% and the average gain was 4.29%. The average duration of these projects was 30.4 weeks and the average delay was 25%.
- the total profit of the projects implemented using the ERP system was 28.36% and the average profit was 26.25%. The average duration of these projects was 35 weeks and the average delay was 19%.

Table 7.

Financial performance and schedule compliance of projects classified as large

	Number of projects	Large projects			
		Financial result		Duration	
		Total profit	Average profit	Average duration (weeks)	Average delay
Implemented without using an ERP system	9	6.46%	4.29%	30.4	25%
Implemented using an ERP system	14	28.36%	26.25%	35	19%

Source: Own work.

In summary, it can be seen that projects that were completed after the implementation of an ERP system achieved better financial results, while maintaining greater compliance with the schedule. The positive impact of implementation was noted regardless of the size and sophistication of the projects.

4. Discussion

The paper answers 3 research questions relating to the evaluation of the impact of ERP implementation on project success in a selected company from the industrial sector.

Referring to the first research question concerning the *way in which the implementation of the ERP system affected the compliance of implemented projects with the assumed budget and schedule*, it should be indicated that the implementation of the ERP system significantly affected the triangle of constraints and, in particular, the achievement of the two success criteria considered most important in the analysed entity, i.e. compliance with the budget and project schedule. It should be noted that, following the implementation of the ERP system, the duration of small projects (where administrative work accounts for the bulk of project work) was significantly reduced, and the company undertook more large, more advanced and complex projects. The projects were implemented successfully and the results were satisfactory.

With regard to the second research question on how the implementation of the ERP system improved project management in the analysed company, it can be concluded that the integration of various functionalities within one software enabled better monitoring of project progress, resource management and tracking of resource utilisation. After the implementation of the software, the comfort of the users increased and the tasks performed by them were carried out much more efficiently. The research also found that the ERP system was rated as a great support in decision-making and facilitating work on several projects simultaneously. Moreover, by having a more advanced liquidity management tool, the company is able to offer more favourable payment terms. The ERP system has also meant that the ease of contact and communication with company representatives has improved, while also influencing the company's greater flexibility. This is a result of the facilitation in the context of stakeholder management and change management that the ERP system brings. The role of ERP in improving organizational performance is also confirmed by other researchers, e.g. Barna et al. (2021); Ram et al. (2014).

In the context of the third research question - *How has the implementation of the ERP system affected the satisfaction of project team members and the company's customers* - it can be indicated that both project team members and customers perceive the benefits associated with the implementation of the ERP system and its impact on the implemented projects. The ERP system was evaluated by project team members as a more optimal solution than the previously used solution, as it facilitated the exchange of information between project team members, as well as reduced the risk of mistakes and exposure of the company to losses. In relation to customers, according to the survey, it was noted that their satisfaction with the products and services offered by the selected company increased. The quality of the products and services offered has also improved, while at the same time the price level has become more attractive. At the same time, the timeliness of product deliveries has increased, which, as stated, is crucial for the specific industry in which the selected company operates.

5. Conclusions

This paper contributes to the project management literature in the area of project success and project evaluation criteria and from the perspective of organisations in the industrial sector improving their internal processes through information systems. Thus, the paper extends existing knowledge in the field of project management and highlights the importance of implementing ERP systems in the context of achieving project success.

In practice, the paper addresses the needs of organisations facing the decision to implement an ERP system and points to certain considerations when implementing such systems. Firstly, information about the implementation of the system should be clearly communicated

within the organisation so that employees understand its purpose and have no concerns about their position and comfort at work. Future users of the system should also be communicated the benefits of implementing the system, including in the area of projects. Secondly, the needs of the organisation and the future users of the system should be carefully examined before implementation, so that the software fulfils its function and provides due support in their work. Analysis of these needs will allow the system to be tailored to the specific requirements of the organisation and increase the chances of implementation success. It should also be mentioned that over-formalisation and complexity of the activities performed within the system can also have a negative impact on the satisfaction of the system users and can slow down project activities. Thirdly, for proper system implementation, it is crucial that end users are properly trained in the use of the system. It is worth investing time and resources in comprehensive training that will enable employees to use all system functions effectively and avoid potential errors. For this, it is necessary to secure adequate financial resources to cover the costs associated with implementation, including the purchase of software, staff training and technical support. And fourthly, for the implementation of an ERP system to be successful, the management should be actively involved in the implementation process and monitor its results and impact on the organisation's operations, including project work. In addition, proper communication and availability of the implementation company and the implementation manager on the enterprise side should also be emphasised.

References

1. Ahmad, M.M., Pinedo-Cuenca, R. (2013). Critical success factors for ERP implementation in SMEs. *Robotics and Computer-Integrated Manufacturing*, Vol. 29, No. 3.
2. Ahmadzadeh, A., Aboumasoudi, A.S., Shahin, A., Teimouri, H. (2021). Studying the critical success factors of ERP in the banking sector: a DEMATEL approach. *International Journal of Procurement Management*, 14(1).
3. Al-Jabri, I.M. (2015). Antecedents of User Satisfaction with ERP Systems: Mediation Analyses. *Kybernetes Journal*, 44, 107-123. <https://doi.org/10.1108/K-05-2014-0101>
4. Al-Mashari, M., Al-Mudimigh, A., Zairi, M. (2003). Enterprise resource planning: A taxonomy of critical factors'. *Eur. J. Oper. Res.*, vol. 14.
5. Al-Okaily, A., Al-Okaily, M., Teoh, A.P. (2023). Evaluating ERP systems success: evidence from Jordanian firms in the age of the digital business. *VINE Journal of Information and Knowledge Management Systems*, Vol. 53 No. 6.
6. Amini, M., Abukari, A. (2020). ERP Systems Architecture For The Modern Age: A Review of The State of The Art Technologies. *Journal of Applied Intelligent Systems and Information Sciences*, 1(2), 70-90. doi: 10.22034/jaisis.2020.232506.1009.

7. Bancroft, N., Seip, H., Sprengel, A. (1998). *Implementing SAP R/3: How to Introduce a Large System into a Large Organization*. Greenwich: Manning Publications.
8. Barna, L., Igna, R. (2021). The influence of the implementation of ERP systems on the performance of an organization. *Proceedings of the International Conference on Business Excellence*, 15(1), <https://doi.org/10.2478/picbe-2021-0026>
9. Chauhan, R., Sherry, A.M., Bhat, V. (2011). *Critical Success Factors for Offshoring of Enterprise Resource Planning (ERP) Implementations – US Experience*. IEEE-International Conference on Recent Trends in Information Technology.
10. Chen, C.C., Law, C.C.H., Yang, S.C. (2009). Managing ERP Implementation Failure: A Project Management Perspective. *IEEE Transactions on Engineering Management*, vol. 56, no. 1, doi: 10.1109/TEM.2008.2009802.
11. Davenport, T.H. (2002). Connecting Enterprise Solutions across Organizations. *Next Generation Enterprise Solutions*, Vol. 7. Accenture - Institute for Strategic Change.
12. Deloitte Consulting (1998). *ERP's Second Wave: Maximizing the Value of ERP-enabled Processes*. New York.
13. Fajfer, P. (2011). Wdrożenie systemu informatycznego – korzyści płynące z użytkowania systemu ERP. *Kwartalnik Naukowy Organizacja i Zarządzanie*, z. 2. Gliwice.
14. Ika, L. (2009). Project Success as a Topic in Project Management Journals. *Project Management Journal*, no. 40.
15. Jessup, L., Valacich, J. (2006). *Information Systems Today: Why it Matters*. NJ, Upper Saddle River: Prentice-Hall.
16. Kale, V. (2001). *SAP R/3. Przewodnik dla menedżerów*. Gliwice: Helion.
17. Karbownik, A. (2017). *Zarządzanie projektami w przedsiębiorstwie*. Gliwice: Wydawnictwo Politechniki Śląskiej.
18. Klaus, H., Rosemann, M., Gable, G. (2000). What Is ERP? *Information Systems Frontiers*, vol. 2.
19. Kunduru, A.R. (2023). Blockchain technology for ERP systems: a review. *American Journal of Engineering, Mechanics and Architecture*, 1(7), 2993-2637.
20. Makipaa, M. (2003). *Implementation of Enterprise Resource Planning System - theoretical research approach and empirical evaluation in two cases*. 26th Information Systems Research Seminar in Scandinavia.
21. Microsoft Corporation. <https://www.dynamicsnav.pl/system-erp/etapy-wdrozenia-erp/diagnoza/>
22. Nagpal, S., Khatri, S.K., Kumar, A. (2015). *Comparative Study of ERP Implementation Strategies*. IEEE Long Island Systems, Applications and Technology. New York.
23. Ouiddad, A., Okar, Ch., Chroqui, R., Hasani, I. (2020). Assessing the impact of enterprise resource planning on decision-making quality: An empirical study. *Kybernetes*, Vol. 50, doi:10.1108/K-04-2019-0273.
24. Panorama Consulting Group: The ERP Report, 2017, 2018, 2022.

25. Parr, A., Shanks, G. (2000). A Model of ERP Project Implementation. *Journal of Information Technology*, Vol. 15.
26. *PMBok Guide* (2019). Wydanie 6. Warszawa: PMI Poland.
27. Ram, J., Wu, M-L., Tagg, R. (2014) Competitive advantage from ERP projects: Examining the role of key implementation drivers. *International Journal of Project Management*, Vol. 32, Iss. 4, <https://doi.org/10.1016/j.ijproman.2013.08.004>.
28. Ross, J.W., Vitale, M.R. (2000). The ERP revolution: surviving versus thriving. *Information Systems Frontiers*, Vol. 2.
29. Spalek, S. (2004). *Krytyczne czynniki sukcesu w zarządzaniu projektami*. Gliwice: Wydawnictwo Politechniki Śląskiej.
30. Supriyono, S., Sutiah, S. (2020). *Improvement of Project Management Using Accelerated SAP Method in the Odoo ERP*. Proceedings of the 1st International Conference on Management, Business, Applied Science, Engineering and Sustainability Development, ICMASES 2019, 9-10 February 2019, Malang, Indonesia.
31. Tavana, M., Hajipour, V., Oveisi, S. (2020). IoT-based enterprise resource planning: Challenges, open issues, applications, architecture, and future research directions. *Internet of Things*, Vol. 11, <https://doi.org/10.1016/j.iot.2020.100262>.
32. Trocki, M. (2012). *Nowoczesne zarządzanie projektami*. Warszawa: PWE.
33. Urbanelis, R. (2014). Sukces projektu: kryteria pomiaru, definicje. *Gospodarka Materialowa i Logistyka*, no. 1.