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The Impact of ERP Systems on the Organization's Sustainable Development in the Era of Digitalization

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Abstract

The objective of this paper is to observe how ERP systems influence the sustainable development of an organization, as well as the need to implement these ERP systems as a result of the massive change in technology in the last period. The aim of the paper is to add value to the literature and research conducted by other authors, given the advantages and disadvantages of digitalizing the organization's activities using ERP systems and the impact of these systems on the sustainable development of the organization. The research method used in this paper was quantitative, based on a questionnaire structured in two sections: a section containing questions outlining the profile of respondents and a section containing questions specific to the research topic of the paper. Thus, it was possible to observe the impact of ERP systems on the sustainable development of the organization. The data collected using the questionnaire were analysed with the Microsoft Excel application based on a regression model built by the author of this paper. The results of analysing the data collected using the questionnaire demonstrate that ERP systems have a significant influence on the process of sustainable development of the organization, as these ERP systems offer the ability to process or import a large volume of data, thus avoiding human error and ensuring a significant increase in the quality and transparency of information. However, without trained staff, the sustainable development of an organization would not be possible, as they have an important role to play in the processing or management of data in the database of ERP systems.

Keywords: ERP systems, sustainability, digitalization, technology, transparency.

JEL Classification: C88, M15, M40, M42, Q01.

1. Introduction

The continuous evolution of technology and the desire to automate tasks have favoured the progress of digitization of activities, so that a large number of organizations have begun to implement high-performance IT systems to automate

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processes, significantly influencing labour productivity and organizational performance.

According to the European Court of Auditors (2020, p. 4), digitalization is often associated with improving the organisation's performance in terms of "productivity, management practices, innovation, growth, and better paid jobs". This accentuated digital transformation in recent years has also occurred due to the fact that most organizations want to remain competitive for as long as possible.

The concept of digitalization is defined as "the use of new technologies, robotics, cloud services, intelligent systems and Big Data that have penetrated rapidly" (Boghian, Socoliu, 2020) that contribute in particular to increasing the efficiency of the organization's activities, as well as the accuracy of data processed with ERP systems. According to Ungur and Cuciureanu (2017), digitalization does not only refer to the acquisition of equipment or computer systems, but also to the possibilities offered by new technologies in streamlining the activities carried out by organizations.

An organization can grow sustainably as long as it is aware that the negative effects of its activity on the environment can be significantly reduced by implementing ERP systems. ERP systems contain many functions useful to the entire organization that decides to implement these systems, which are arranged modularly as follows: specific modules "supply business, finance, human resources, accounting, sales and other customer-specific modules depending on the field of activity" (Rajan, Baral, 2015). Thus, these systems offer the possibility to digitalize a large number of activities within the organization (Hietala, Päivärinta, 2021), so that the information processed with these systems is much more "correct and complete, providing a correct and complete picture of the situation of the organization" (Kanellou, Spathis, 2013).

2. Problem Statement

ERP systems integrate a lot of business processes such as: supply, accounting, human resources, finance, production, and sales (Spathis, Ananiadis, 2005; Hassan, Mouakket, 2015; Rajan, Baral, 2015). The main advantage of these systems is that they process a large volume of data in a short time. At the same time, all processed information is saved in the application database, ensuring quick access to data and reducing the amount of printed paper facilitating the sustainable development of organizations (Ursăcescu et al., 2019).

Sustainability is an important economic component both for the business environment and for managers and entrepreneurs (Dona, 2020). Danciu (2013) considers the concept of sustainability as an "important strategic component for the future of the organization", because, based on it and the data provided by ERP systems, managers make different decisions regarding the continuity of the organization's activity.

Organizations that want to grow sustainably must be "socially responsible" (Mirghafoori et al., 2017) and must use IT equipment that consumes less electricity and use complementary resources at the expense of traditional resources

(Mathews, 2015). Knut (2016) believes that the role of sustainability for an organization is to ensure value creation for as long as possible.

Oracle (2020) identified the main benefits of the ERP system within the organization:

- data accuracy;
- low operating costs;
- automation of a very large number of work tasks;
- reducing the risk of errors in the ERP system due to the controls implemented in the IT system.

Given the many advantages offered by ERP systems, HassabElnaby et al. (2012) consider that they have an impact on the fulfillment of "strategic, organizational, management, operational and IT infrastructure objectives".

Watson et al. (2010, cited by Bradford et al., 2012) consider that ERP systems provide a "multilateral view of the organization" because information in different areas is easily integrated and processed by ERP systems. The main criteria that an ERP system has in the sustainable development of an organization are efficiency, energy consumption as low as possible, reliability, and portability.

Following the digitalization process, the role of users of financial-accounting information will no longer focus only on document processing, but will also include skills related to analysis and consulting, being able to interpret the data that will be processed using ERP systems (Boghian, Socoliuc, 2020). Digitalization offers the opportunity to open new horizons, through which users of financial-accounting information "will be able to capitalize on their knowledge to provide new services to customers" (CECCAR, 2019).

3. Research Questions / Aims of the Research

The purpose of this article was to be observe how ERP systems influence the sustainable development of an organization, as well as the need to implement these ERP systems as a result of the massive change in technology in the last period.

4. Research Methods

The research method used in this paper was quantitative, based on a questionnaire structured in two sections: a section containing questions outlining the profile of respondents and a section containing questions specific to the research topic of the paper. The questionnaire contained closed-ended questions and 5-step Likert scale questions to identify the relationship between ERP systems and the sustainable development of the organization. The reason why I chose the quantitative research method was to conduct a detailed and in-depth investigation in order to observe the perception of ERP users regarding the sustainable development of the organization in the digital age.

The questionnaire was distributed between November 13, 2020 and November 24, 2021 to respondents who work in the economic field and use ERP systems, taking into account the level of studies graduated. The limitations of my research were due

to the limited access to the number of respondents who use these systems, some of the respondents using integrated applications implemented by the company. Even though the number of companies implementing ERP systems is growing, there are still quite a few companies using integrated applications implemented internally.

The respondents who participated in the survey were between 20 and 70 years old, most of them residing in urban areas (79.6%), the rest coming from rural areas (20.4%). The studies graduated by the respondents are mostly undergraduate studies (79 respondents), followed by those with master studies (29 respondents), and then doctoral studies (4 respondents).

In this study, I constructed based on the questionnaire a multifactorial regression model consisting of 5 components (independent variables) as follows:

$$y = \alpha_0 + \alpha_1 * SLOW + \alpha_2 * SQUAL + \alpha_3 * SPROD + \alpha_4 * SACT + \alpha_5 * SINFRA + e \quad (1)$$

where:
SLOW = cost reduction;
SQUAL = quality and transparency of information;
SPROD = improved productivity;
SACT = the influence of the activity of the organization in general;
SINFRA = the infrastructure of the organization.

I formulated 4 hypotheses presented in Table 1:

**Table 1. The hypotheses that will be tested based
on the multifactorial regression model**

No. crt.	Hypotheses	Relationship
H_1	ERP systems (SERP) provide support in the sustainable development of the organization	SERP and independent variables: SLOW, SQUAL, SPROD, SACT, SINFRA
H_2	There is a significant relationship between SERP and SLOW, SQUAL, SPROD	SERP and independent variables: SLOW, SQUAL, SPROD
H_3	There is a significant relationship between SERP and SQUAL, SINFRA	SERP and independent variables: SQUAL and SINFRA
H_4	There is a significant relationship between SERP and SACT, SINFRA	SERP and independent variables: SACT and SINFRA

Source: Author's creation.

5. Findings

The first part of the questionnaire contained questions based on which I was able to outline the profile of the respondents so that they could distribute the results according to their residence or type. Most respondents come from urban areas in a percentage of 79.6% according to the chart in Figure 1, and most of them being enrolled in university, master's or doctorate.

Figure 1. Distribution of respondents by residence
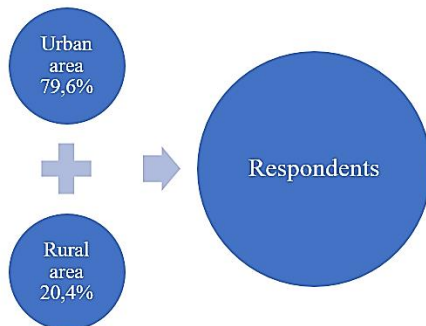
Source: Author's creation.

In Figure 2, I analysed the distribution of respondents according to gender and area of residence, observing that the largest share of respondents who responded to this questionnaire are female and live in urban areas.

Figure 2. Distribution of respondents according to gender and area of residence
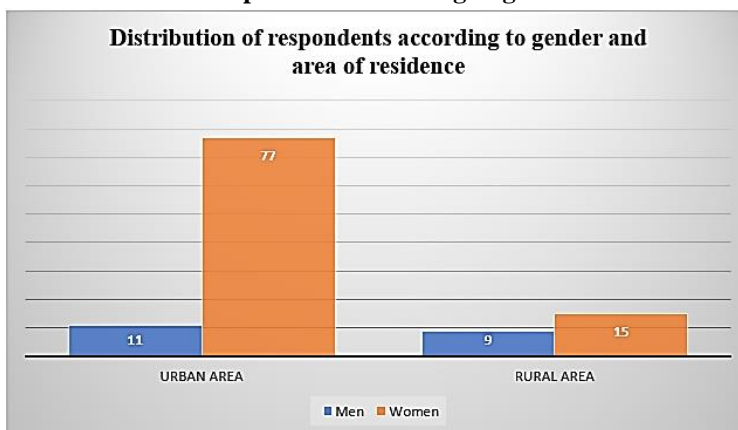
Source: Author's creation.

In Table 2, I presented a correlation between the age and the experience of the respondents in using ERP systems:

Table 2. Correlation between the age and the experience of the respondents

Age (years)	Experience				
	< 6 months	6 months - 1 year	1-5 years	5-10 years	>10 years
20 - 30	47	23	23	-	-
31 - 40	3	1	3	1	-
41 - 50	1	-	1	-	2
51 - 60	2	2	-	1	1
61 - 70	1	-	-	-	-
Total	54	26	27	2	3

Source: Author's creation.

According to data published by Eurostat in 2019, most young people start their first job at the age of 24 or 25, because younger people aged between 20 and 24 follow another form of education (university, post-secondary education). Some young people start working during their undergraduate studies.

In the second part of the questionnaire, I analysed whether ERP systems have an impact on the sustainable development of the organization, using the regression model built (1). The data collected using the questionnaire were statistically analysed using the Microsoft Excel application, performing a regression analysis to observe the impact of ERP systems on the sustainable development of the organization.

Based on the data that substantiated the construction of the regression model, I obtained the following relevant data from the regression analysis presented in Table 3:

Table 3. Summary output

Multiple R	0.9778
R Square	0.9561
Adjusted R Square	0.9453
Standard Error	0.9541
Observations	112

Source: Author's creation.

The regression coefficient (Multiple R) has a value of 0.9778 which is a value very close to 1, indicating that there is a very strong relationship between the SERP dependent variable and the independent variables (SLOW, SQUAL, SPROD, SACT, SINFRA). At the same time, according to the data obtained in Table 3, I can see that the variation of the dependent variable (SERP) is explained in a percentage of 95.61% (a value very close to 100%) of the independent variables (SLOW, SQUAL, SPROD, SACT, SINFRA).

Table 4. ANOVA

	df	SS (Sum of Squares)	MS (Mean Square)	F	Significance F
Regression	5	2130.60	426.12	468.07	0
Residual	107	97.41	0.91	-	-
Total	112	2228	-	-	-

Source: Author's creation.

According to Table 4, I tested the validity of the constructed regression model, observing that the value of the significance threshold (Significance F = 0) is less than 0.05, resulting that the constructed regression model is valid.

Table 5. Coefficients of independent variables

Model	Coeffi-cients	Standard Error	t Stat	P-Value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
X_1 - SLOW	0.0561	0.1181	0.4752	0.6355	-0.1780	0.2903	-0.1780	0.2903
X_2 - SQUAL	0.3146	0.1445	2.1764	0.0317	0.028	0.6011	0.028	0.6011
X_3 - SPROD	0.2921	0.1675	1.7432	0.0841	-0.04	0.6242	-0.04	0.6242
X_4 - SACT	0.0468	0.1754	0.2670	0.7899	-0.301	0.3947	-0.301	0.3947
X_5 - SINFRA	0.3445	0.1471	2.3420	0.0210	0.0529	0.6362	0.0529	0.6362

Source: Author's creation.

Based on the table 5, I established the coefficients from the regression model, which is below presented:

$$y = 0.0561 * X_1 + 0.3146 * X_2 + 0.2921 * X_3 + 0.0468 * X_4 + 0.3445 * X_5 + e \quad (2)$$

where:

X_1 = cost reduction (SLOW);
X_2 = quality and transparency of information (SQUAL);
X_3 = improved productivity (SPROD);
X_4 = the influence of the activity of the organization in general (SACT);
X_5 = the infrastructure of the organization (SINFRA).

At the same time, I tested the significance of the variables in Table 6, thus identifying only the variables that will remain valid within the constructed regression model. To calculate the significance of these variables, I used the values obtained in the P-value column of Table 5.

Table 6. Coefficients of independent variables

Independent variable	Calculating the significance of variables 100% - (p-value * 100)	Significant / Insignificant
X_1 - SLOW	36.44% < 95%	Insignificant
X_2 - SQUAL	96.83% > 95%	Significant
X_3 - SPROD	91.58% < 95%	Insignificant
X_4 - SACT	21% < 95%	Insignificant
X_5 - SINFRA	97.90% > 95%	Significant

Source: Author's creation.

From the regression model built, after testing the significance of variables it can be observed that the main factors influencing the sustainable development of the organization are the quality and transparency of information processed with ERP systems, but also the organization's infrastructure greatly influences the flow of information through ERP systems. Thus, the regression model remained composed of only 2 variables that which are significant:

$$y = 0.3146 * X_2 + 0.3445 * X_5 + e \qquad\qquad (3)$$

where:
X_2 = quality and transparency of information (SQUAL);
X_5 = the infrastructure of the organization (SINFRA).

The independent variables SLOW, SPROD, SACT obtained values lower than 95%, consequently these variables are not significant and were eliminated from the model.

In Table 7, I checked the hypotheses that are confirmed or denial to outline the final conclusions.

Table 7. Hypotheses tested based on the multifactorial regression model – confirmation or denial of hypotheses

No.	Hypotheses	Relationship	Confirmation / Denial
H_1	ERP systems (SERP) provide support in the sustainable development of the organization	SERP and independent variables: SLOW, SQUAL, SPROD, SACT, SINFRA	Partially confirmed only by variables SQUAL and SINFRA
H_2	There is a significant relationship between SERP and SLOW, SQUAL, SPROD	SERP and independent variables: SLOW, SQUAL, SPROD	Denial
H_3	There is a significant relationship between SERP and SQUAL, SINFRA	SERP and independent variables: SQUAL and SINFRA	Confirmation
H_4	There is a significant relationship between SERP and SACT, SINFRA	SERP and independent variables: SACT and SINFRA	Denial

Source: Author's creation.

The reasoning behind the confirmation or denial of the hypotheses formulated in the methodology part of the research was based on the significance of the independent variables in the regression model tested and statistically analysed. Thus, only hypothesis H3 was confirmed and hypothesis H_1, which was partially confirmed, because only between the dependent variable (SERP – ERP systems in sustainable development of the organization) and independent variables (SQUAL – quality and transparency of information, SINFRA - organization infrastructure) exist a significant relationship.

6. Conclusions

Given the rapid evolution of IT technologies in recent years, it has led to an increase in the degree of automation due to the need to process a very large volume of data in a short period of time, and the data processed to be as accurate and complete as possible, but also to increase the credibility of the data. The degree of automation of the activity carried out by the organization greatly depends on the increase of the competitiveness between the organizations.

Digital transformation also involves costs, efforts, and risks to keep up with technological developments. Thus, any organization must take into account changes in the field of IT technologies and invest in high-performance IT equipment or systems so that it can streamline its work, but also reduce the negative effects on the environment that could occur as a result of the activity carried out by the organization.

The use of high-performance IT systems, especially ERP systems, would allow the organization to develop sustainably in the context of the evolution of digitalisation. The use of ERP systems is the way in which organizations can significantly reduce the inefficient consumption of resources (paper, electricity), and all activities of the organization can be automated with these systems. Sustainable development is the key to meeting current needs without compromising the ability to meet the needs of future generations.

Given the results obtained in the study conducted in this article, I noticed that ERP systems offer a higher quality and transparency of data processed with these systems, while having an impact on managing the flow of information between departments in electronic format, to the detriment of printing excessive amount of information to be distributed between the departments of the organization, as the data is stored in the database of the ERP system.

All processed data is stored in the database of the ERP system in order to be easily accessed by employees of the organization in different departments for faster preparation of monthly reports that will be presented to managers. Data processed with ERP systems are much more transparent, providing a clearer picture of the organization. Based on the data provided by the ERP systems, the important decisions are taken regarding the continuation of the organization's activity, so as to reduce as much as possible the risks to which the organization could be subjected. Managers make the most important decisions regarding all the functions and assets of the organization, ensuring the continuation of the activity. Thus, before implementing an IT system, it must first consider the risks to which the organization may be exposed when transferring data from the previous system to the one in which it was implemented.

Managers' expectations regarding the implementation of ERP systems are mainly: supporting the achievement of business objectives, flexibility, accuracy, cost reduction, and supporting the entire activity of the organization.

In conclusion, I can say that ERP systems provide support in the sustainable development of organizations because they play an important role in the processing, storage, and distribution of data within organizations.

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