

Sustainable Development of Companies Using the ERP System as a Fundamental Tool of Digital Transformation

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Abstract

Purpose of the article: The purpose is to verify that ERP system implementations are in accordance with the company growth. There is no doubt that the ERP system as a representative of digitalisation tools aims at optimisation of resources and processes, while also contributing to sustainability.

Methodology/Methods: The article is based on processing and sorting of secondary data published by the Czech Statistical Office. All relevant data were issued in different formats and structures so they needed to be parsed, cleaned and unified. It would not be possible to achieve expected results without such data transformation requiring knowledge in the field. To ensure higher validity of the study, the dependence between two researched aspects was observed in the lowest possible detail of the data and then summarised into present the final result.

Scientific aim: The aim is to identify the relationship between the ERP system implementations and company growth. The study assumes that companies are motivated to digital transformation if it helps them to increase their production or do not temporarily slow it down because of the lifecycle and consequences of the implementation covering investment, deployment and usage of the ERP.

Findings: Although the number of Czech companies using an ERP system is not constantly growing, the enterprise production is increasing during the reference period. This phenomenon is noticeable in almost every NACE industry in years 2015, 2017 and 2019. Even though the number of firms using the ERP is not clearly growing, as there is a fall in 2017, the general trend between 2015 and 2019 is increasing.

Conclusions: As there is no negative effect of implementation of the ERP system on company growth, enterprises are willing to invest into their digital transformation and thus to support sustainable development as a whole.

Keywords: ERP system, company growth, sustainable development, digital transformation

JEL Classification: M15, M21

Introduction

Traditional key aspects of an effectively managed business were properly chosen functional structures, adequately set up processes and human resources. Digital transformation tools and information systems are nowadays another important aspect connected with the digital revolution dated to the turn of the 20th and 21st centuries. It is also an integral part of sustainable development of companies, since their growth associated with digital transformation leads to the reduced burden on the environment. This association can appear in two main lines. The first one is paperless office that, owing to digitalisation of documents, affects the amount of paper used and thus saves forests, energy and water as a part of paper production (Orantes-Jimenez *et al.*, 2015). The second point is based on automation of particular processes in company owing to the appropriate implementation of the ERP system. The optimisation of processes leads to savings in production material, transport logistics, storage and many other aspects which highly influence the impact on the environment. Therefore, a well implemented and used ERP system is closely related to sustainable development as, for example, Hasan *et al.* (2017) proved by identification of sustainability indicators related to the ERP system elements. When considering (Elliott, 2013) sustainable development as a way to meet the needs of the present without compromising the ability of future generations to meet their own needs, the evolution of companies using digital transition tools such as the ERP is a must.

At a time when companies are increasingly resonating with the issues of association with the Fourth Industrial Revolutions and a large amount of investment is being realised in the areas of the Internet of Things, Cloud Computing and Big Data, the enterprise information system is a matter of course and a prerequisite for further development of companies in the field of digital transformation (Jain,

Hazra, 2019). Such a development of advanced digital areas cannot be considered without any information system covering the basic processes determining the day-to-day running of a business. First and foremost, it is necessary to provide an environment which allows the transformation of information into the digital form. Once the collection and storage of data is secured, then it is possible to consider their further processing and transmission. The information resulting from the database has got an extraordinary value for the decision-making process and further development of the company. According to Azevedo *et al.* (2012), the goal is to cover the maximum number of company processes with an information system so that the processed data is as comprehensive as possible and has a high relevance in further managerial decision-making process. From this point of view, the existence of an enterprise information system is not only a prerequisite for the further development of the company in the field of digital transformation and advanced digital tools of Industry 4.0, but also a key factor for the company success in a competitive market environment.

Although information systems form a part of more conservative area of the ICT, as their importance and key role for enterprises predispose them to more careful and controlled development (Haddara, 2018), they are still information technologies that are generally developing rapidly. Especially in recent years, there has been a significant change in strategy in the market of ERP¹ systems which can be considered the most common representative of information systems. The ERP system product strategy follows CRM, APS, WMS and other systems which are the representatives of the wave of fully cloud services in the form of SaaS² (Lee, 2021). It is obvious

¹ Enterprise Resource Planning is focused on integration of a large number of business processes, such as finance, purchasing, sales, production, warehousing, trade, *etc.*

² Software as a Service, or SaaS is a model of software deployment, where the application is hosted by the service provider.

that in addition to a number of benefits that the approach brings to end customers, there are also fundamental interventions in the data structure, functionalities, and especially the philosophy of the corporate information system. Current users of on-premise³ ERP systems can be disappointed by weaknesses of cloud products such as significant streamlining of functionalities and a higher degree of standardisation, which undoubtedly means lower user comfort. Nevertheless, Granlund (2011) considers even every ERP system, not only the cloud one, as the path towards standardisations of processes. On the other hand, cloud ERP systems bring deeper flexibility of the licence size and the number of users in time and even distribution of costs in cash flow and lower system administration requirements (Johansson, Ruivo, 2013). These aspects can be marked as the most important for companies considering the implementation of an ERP system. Owing to the SaaS, they are plainly more available for expanded target group of companies.

The aim of the study is to identify the relationship between ERP system implementations and company growth. According to Koch (2013), company performance is one of two main interests of every enterprise. This is demonstrated by a number of ERP implementations in 2015, 2017 and 2019 in the Czech Republic and enterprise production according to selected industries, so called NACE⁴. Although there is no doubt that information technologies highly influence company work productivity (Tisdell, 2017), the existence of many other aspects affecting enterprise production cannot be ignored. That is why research will work with statistic data from three terms that are years 2015, 2017 and 2019 and the NACE division of data sample, which will enhance the

validity and reliability of the paper. The issue of production influence by ERP system is often-mentioned question and aspect considered by managers and owners when dealing with the decision of ERP implementation.

Literature Review

Research of ERP benefits is an extensive discipline. One of the basic and traditional descriptions was provided by Shang, Seddon (2002), consisting in the classification into strategic, managerial, operational, IT infrastructure and organisational benefits.

The ERP system may be perceived as a tool for enhancing organisational efficiency, strengthening competitiveness and achieving business results (Beheshti, Beheshti, 2010). Also, Pálka, Hajkrová (2015) claim that the strategic objective of information system is to support growth and performance of an enterprise. There has been research which demonstrates significant improvements in production (Velcu, 2007; Aremu *et al.*, 2020) or efficient use of resources (Badewi *et al.*, 2018; Elkhoully, Elkomy, 2019) due to the ERP implementation. Goumas *et al.* (2018) even describes how deep contribution the ERP system had to the overall performance related to the production stage in manufacturing industries in small and medium enterprises. The most significant result has been demonstrated in the quality of reports and accounting statements. Also, Antero, Riis (2011) underline that there is indisputable contribution of the ERP in production performance. Hunton *et al.* (2003) also demonstrated some positive results when comparing return on assets, return on investments, and asset turnover.

On the other hand, Wieder *et al.* (2006) claim that they did not find any significant improvement in company performance as declared by ERP vendors. There are also other earlier studies concluding on no significant impact and identifying non-financial benefits

³ On-premise software is installed and runs on computers on the premises of a person or organisation that uses the software, rather than on a remote device such as a server farm or cloud.

⁴ Nomenclature statistique des activités économiques dans la Communauté européenne.

as proxies for financial value (Beretta, 2002). Havíř (2021) mentions that digitisation can also lead to negative effects of the company outputs on the customer.

In their study, Albu *et al.* (2015) added that the increase of organisational performance is also influenced by the manner in which the ERP system was implemented. This field is usually covered by so called critical success factors identified and described by various authors. Kala Kamdjoug *et al.* (2020) mention the importance and role of application consultants and their relationship with the client in general. A similar issue is addressed by Ayat *et al.* (2020), who in their research divide countries into three cultural categories and point out the different importance of critical success factors with respect to a specific geographical and cultural distribution.

There has been an undisputable association between the digital transformation represented by *e.g.* ERP systems and sustainable development. Hilty *et al.* (2005) classify ERP software among tools for environmental activities of a company. These activities have committed themselves to strive for a more sustainable way of producing (Dyckhoff, 2000).

Methods

The methodology of the paper is designed to respond to the following research question: Is there any relationship between the trend of production of companies and the number of companies using ERP systems? Therefore, the scientific aim of the research is to identify the influence of the ERP use frequency on production of companies in a particular industry at a particular time. These two variables were selected, since ERP systems, as one of the tools of sustainable development of companies, are expected to ensure higher company performance.

The study is based on secondary data officially published by the Czech Statistical

Office. In this manner, the data can be used for the purposes of the research, and there was a need to make its parsing, cleansing and unification. It analyses production of enterprises and the number of companies using the ERP system according to selected NACE industries. The years used for comparison are 2015, 2017 and 2019. Regarding the size of the base and selected sample, *i.e.* the number of enterprises selected for the research, there were 7,644 companies in 2015, 7,977 companies in 2016 and 8,126 companies in 2019. However, there was a methodical obstacle lying in different distinction of NACE categories per production and companies with the ERP system. This was solved by omitting some categories and also joining those that were merged in the second parameter. As a result, the data validity and uniformity are ensured.

The limits of the study are marked by the fact that data provided by the Czech Statistical Office obviously cover companies from the Czech Republic. The research does not distinguish between small, medium and large companies, since this parameter is not relevant for the research question. As the analysed secondary data comprise guaranteed outputs of the Czech Statistical Office, there is no misgiving about its validity and accuracy.

The question of potential increased interest of companies in the ERP system implementation is observed by the statistics of companies currently using any such system. This means that the system has been already implemented and is used. For the purposes of the comparison with the company growth, the production aspect has been selected. Production is set as a part of the GDP calculated by the production method. The GDP is the difference between production and intermediate consumption. With regard to the fact that production is valued at basic prices and use at purchase prices, the side of national economy resources is supplemented by taxes reduced by subsidies on products (Choiniere, Horowitz, 2001).

Results

To fulfil the aim of the study, two main aspects need to be considered: the number of companies using the ERP system, as a tool for sustainable development of companies, and enterprise production. To analyse and verify the scientific question, the study processes officially data published by the Czech Statistical Office. It is the main organisation for collecting, analysing and disseminating statistical information of the Czech Republic. It ensures the comparability of statistical information on a national and international level. The obtained data are provided to public authorities and the general public. The data related to the ICT area in the required level of detail for the purposes of the research are collected once per two years. This is the reason why the research shows results of years 2015, 2017 and 2019, *i.e.* for last three published periods. The NACE industry representatives are selected according to their possibility to be compared between each other in the specific years and required detail. The selection is also influenced by available data for second analysis of the relationship between ERP using and enterprise production. As a result, this selected sample ensures data homogeneity.

The share in the total number of companies using the ERP system shows that the trend is not clearly growing, since the values in 2017 are at almost every industry lower than two years before. The second important finding is that there is a rapid demand for ERP between years 2017 and 2019. The values in most cases show increase in tens of per cent.

Although it cannot be said that the trend of the number of companies using the ERP system is regularly growing, there is no doubt that the result of the latest examined year of 2019 clearly exceeds the values of previous years.

To fulfil the aim of the study, it is necessary to compare the above presented results with enterprise production in selected years and the NACE industry. These values are presented in Table 2.

Enterprise production in the analysed years implies continual growth in almost every NACE category except electricity, gas, steam and air conditioning supply between years 2015 and 2017. The share of this industry is negligible, so there is no effect on total values in observed years.

To unambiguously interpret both analysed values in the monitored years, the results are also projected into a graph. It shows that in

Table 1. Share in the total number of companies according to the NACE industry in years 2015, 2017 and 2019.

NACE Industry	Companies with ERP in 2015 (%)	Companies with ERP in 2017 (%)	Companies with ERP in 2019 (%)
Manufacturing	37.6	36.6	48.4
Electricity, gas, steam and AC supply	33.4	25.4	51.0
Construction	16.1	14.8	17.5
Wholesale and retail	34.4	31.9	46.2
Transport and storage	20.6	14.1	23.5
Accommodation, food and hospitality	12.5	13.1	19.3
Information and communication activities	51.4	41.0	54.2
Real estate activities	22.5	19.2	28.4
Professional, scientific and technical activities	26.8	24.0	34.3
Administrative, support and other services	27.3	18.7	30.2
AVERAGE VALUE	28.3	22.9	35.3

Source: Czech Statistical Office, 2021.

Table 2. Enterprise production according to the NACE industry in years 2015, 2017 and 2019.

NACE Industry	Production in 2015 (in mio. CZK)	Production in 2017 (in mio. CZK)	Production in 2019 (in mio. CZK)
Manufacturing	4,138,573	4,519,251	4,795,577
Electricity, gas, steam and AC supply	376,985	372,142	376,382
Construction	781,524	800,278	954,003
Wholesale and retail	919,456	1,035,026	1,135,230
Transport and storage	634,816	680,432	752,134
Accommodation, food and hospitality	169,909	208,086	239,089
Information and communication activities	401,386	461,989	557,415
Real estate activities	664,852	738,654	862,912
Professional, scientific and technical activities	505,240	550,464	636,260
Administrative, support and other services	279,048	341,330	409,754
TOTAL	8,871,789	9,707,652	10,718,756

Source: Czech Statistical Office, 2021.

spite of the fact that the share in the total number of companies using an information system declined from 28.3% in 2015 to 22.9% in 2017, there is still a growing trend of enterprise production from 8,871,789 to 9,707,652 million Czech crowns. The year 2019 is growing

in both monitored values. Companies in the selected NACE industries produced 10,718,756 million Czech crowns, while 35.3% were using an ERP system at that time.

When comparing the total production values of all NACE industries and average

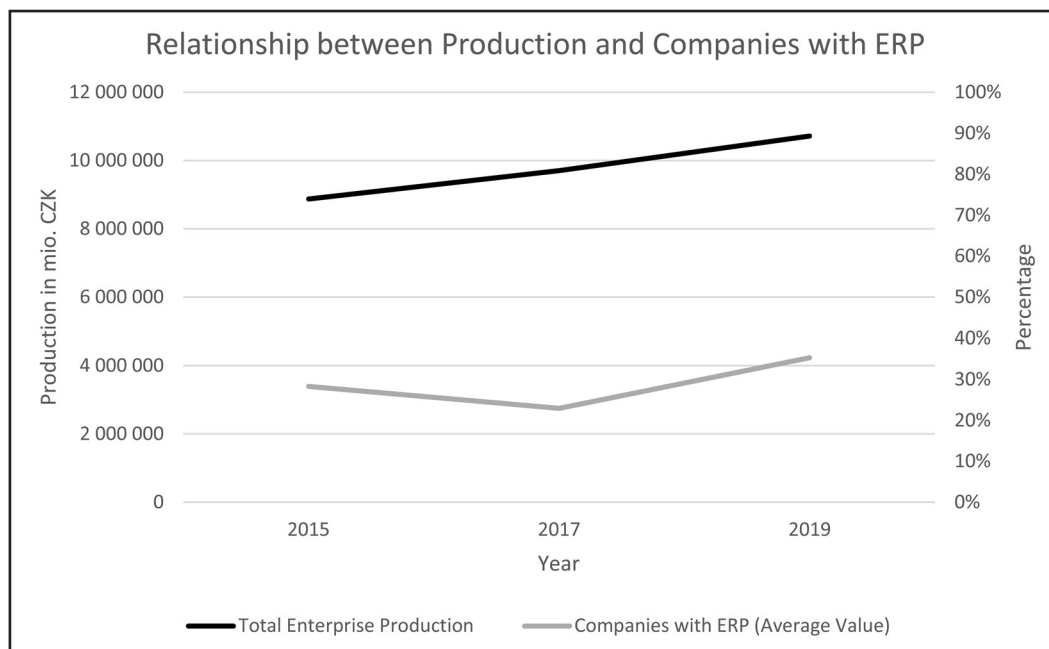


Figure 1. Total Production and Average Value of Companies with ERP in years 2015, 2017 and 2019.

Source: Own design based on the Czech Statistical Office data, www.czso.cz, 2021.

values of companies with ERP, it is obvious that there is no negative influence of the ERP system using on production from the macroeconomic point of view. This fact is also evident from the detailed analysis of Tables 1 and 2 when processing data per particular NACE.

Discussions

The implementation of an information system is a complex and difficult project which requires high investment and demands on cooperation of productive employees. Possible positive effects usually come later after the implementation. This can discourage companies from investment into digital transformation tools which help to sustainably develop the enterprise environment. The general result of the study lies in the fact that there is no negative effect of the ERP implementation on company growth. This means that companies are willing to invest into tools of digital transformation. Tools such as ERP, in addition to other benefits, aim at optimisation of resources and processes contributing to sustainable development next to other direct influence represented by paperless office or emphasis on digitalisation.

The decreasing share of companies with ERP in 2017 is surprising. The most probable reason associated with the possible change of methodology can be excluded, as there is no change in questionnaires between years 2015 and 2017. The only deviation lies in detailed explanation of ERP description. This could possibly have some impact on decreased numbers; however, the deeper analysis of companies with ERP in other European countries shows that this trend is more common. The same phenomenon in 2017 can be observed in Denmark, France, Slovenia, or Germany. The same trend can be also seen, for example, in the case of companies using CRM systems in the Czech Republic (Czech Statistical Office, 2021). These facts point

out a real change in the market of ERP in Europe in 2017.

The second possible cause of the unbalanced values in 2017 could lie in significant increase of the number of new companies in such an extent that ICT market is not able to penetrate demand. Even this cause has been dispelled, since more thorough research has shown that the difference between the number of companies with more than 10 employees increased by 3.5% between 2015–2017 and by 3.7% between 2017–2019 (Czech Statistical Office, 2021).

With respect to research claiming influence of ERP on company production (Velcu, 2007), there is a need to mention that the results of this study do not deny any link between ERP and company production in particular cases. The macroeconomic perspective of this issue just shows that there are other more important aspects which have a stronger effect on production which downplays the ERP role in this point of view.

Conclusion

The total trend of the number of companies using the ERP system in the Czech Republic is increasing from the perspective of the whole selected period 2015–2019, and yet there is an important deviation in 2017. As mentioned above, two most probable causes – a change in the methodology and a significant increase of the number of new companies – has been reasonably excluded. It is an unexpected phenomenon also appearing in other European countries which deserves attention of possible specially focused research on this topic.

Owing to the deviating direction of the trend, it can be also said that a number of companies using the ERP system does not have such a significant effect that could fundamentally change enterprise production. At least not to the extent that can be captured in comparison with other substantial factors

influencing enterprise production. From the perspective of sustainability, it is important that the ERP system implementations that indisputably contribute to sustainable development of companies do not negatively influence economic results. Natural managerial thinking leads to an expectation that investment into ICT tools such as the ERP system need to lead to increase of production. However, every socially responsible company or organisation should appreciate the positive effect of ERP on sustainable development, as well as an increase in production which, as a result of this study, is neither guaranteed nor excluded.

The study is based on macroeconomic perspective which means that its results are not in contradiction with research exploring the ERP use effect on a particular company or

another legal entity. The limits of the study are related to the secondary data sample of Czech companies of ten and more employees in years 2015, 2017 and 2019. To exclude the possible error of 2017 deviation in number of companies using ERP, European data sample provided by the Czech Statistical Office was used.

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