THE EFFECT OF THE INTRODUCTION OF INFORMATION SYSTEMS IN MANUFACTURING COMPANIES ON THEIR MARKET POSITION

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Abstract: *The simplest fact that every computer or phone becomes obsolete after a few months tells us how necessary it is to monitor technological achievements. We are witnessing the accelerated development of technology in all spheres of life. However, when we talk about the business of manufacturing companies, the basis for their survival in today's chaotic competitive market is to reduce production costs and accelerate all possible production processes. What it means ? In the IT sense, it means finding an appropriate software solution that will significantly reduce the flow time and analysis of information crucial for making important decisions. This is exactly what will be discussed in this paper. The fact is that today's market is very harsh and that the basis of the company's survival is monitoring IT trends.*

Key words*: Company, technology, information, market, survival.*

1. INTRODUCTION

It is superfluous nowadays to talk about the importance of technology and information systems. The application of the latest technology in business has become a basic business imperative. We are all witnessing how much information systems facilitate the functioning of any system. In the essence of every information system we have input, information processing and output (Figure 1). Decision-making through the information system is accelerated and of better quality, which is crucial in the turbulent market for the survival of the company and which is also the main purpose of this work - to prove how important it is to support the production company to maintain the most successful market position.

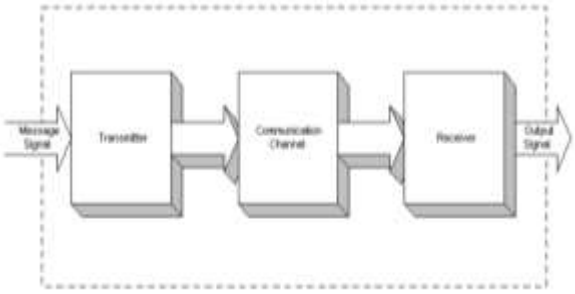

Figure 1: Information system

In this regard, the problem observed in this paper is the need to introduce information systems, especially in production-oriented companies in the Zlatibor district.
Why is it so important to draw attention to the importance of information systems in the functioning of the company? Well, the technological environment is developing rapidly every day and that the market is becoming more and more cruel and that only companies that adequately and quickly adapt to changes in the environment survive. This paper should show that the relationship between the implementation of an adequate information system in a manufacturing company and its position in the market, in fact its business success.

According to the data available [1], [2] and [3], it is noticed that a large number of companies are closing down and a certain number of companies survive in the harsh market. What needed to be determined was what it was that helped certain companies to successfully maintain business success.
From the above, it can be inferred that the aim of this paper is to draw attention to the role of the information system in the operation of the production system.
The task of this paper is to use relevant methods to collect relevant data on the company's operations, process it and analyze it. What should be proven by this research is:
• companies that value and keep pace with technology survive in the market,
• the introduction of an information system in production companies reduces production costs,
• the introduction of an information system in manufacturing companies significantly facilitates the work of employees.
Data from 22 production – oriented companies from the Zlatibor district during 2019. and 2020. year were used for the data set. The limitation in data collection is the smaller sample size, which is a consequence of the beginning of the COVID-19 virus pandemic, so the relevance of the obtained research results should be taken into account.
The basic method used for this research is the survey method. The necessary data for this research were collected by written interviews. In addition to this method, analsis and statistics were used as auxiliary scientific methods in the summary processing of the obtained data, which will be discussed in the second part of the paper.

2. INFORMATION SYSTEMSIN PRODUCTION COMPANIES

Many other authors in this field, when it comes to the introduction of information systems in industrial plants, believe that the application of these systems is one of the most efficient solutions to achieve huge effects in industrial production, which is key to survival in such a chaotic, unpredictable market. They believe that there is a really justified foundation in the rapid and stable development of information and communication technology resources and that they certainly have a certain future. Based on several researches in this part large number of researchers and authors agree that computer integrated production will be the dominant form of production in general, and that most production systems will operate according to its basic principles, can be found in sources [3], [4], [5].
When it comes to software-supported management of industrial enterprises, it is first necessary to briefly explain ERP and MES systems in order to understand what is the subject of this research.

2.1. ERP I MES SYSTEMS

ERP (Enterprise Resources Planning) is business resource planning and MES (Manufacturing Execution System) is an executive production system.
During my own research, which began before the corona virus pandemic, and which referred to the parallel introduction of information systems in manufacturing companies and their impact on their market position, I was able to confirm at the beginning of the surveyed companies that the basic prerequisite for survival is a constant struggle for accurate information.
ERP systems are systems that integrate, as I have already mentioned, and process information based on monitoring business processes in the company. Today, they are simply the basic foundation of a successful business of any serious company. By applying these systems, what is provided to the company is the standardization, integration and automation of all business processes. In this way, top management in a short time has all the relevant information on the basis of which very easily and accurately makes accurate and quality decisions that have a direct impact on the future of the company and at the same time increases customer and user satisfaction, which is the main purpose of every company.
ERP systems are transactional systems that provide information through different functional and business units in the organization as can be seen in Figure 2. ERP system integrates various organizational systems and facilitates transactions, thus increasing the efficiency of the organization [2].
Very often organizations try to keep their budgets as small as possible and reduce costs in order to avoid downsizing. Because of the cost, investing in a new business information system or just upgrading an existing information system is a very difficult decision and a big challenge for any organization. Investments in technology, like all other investments, arise from careful consideration of analyzes and assessments according [5].

Figure2: ERP systems

The MES system provide real-time information that helps to make decisions in order to improve production processes and allows control over all elements of the production process [6]. MES systems can be understood as an intermediate layer in the architecture of the Industrial Enterprise Information System, where on the one hand there is an ERP system, and on the other a Supervisory Control and Data Acquisition (SCADA), or a process control system.The correlation of ERP, MES and production system according to [7] is shown in Figure 3**.**

Figure3: ERP, MES and workshop

According to [1], the time required for the implementation of a system whether ERP system or MES system is on average two years in the following phases of the ERP or MES system life cycle: - Phase of making a decision on implementation (adoption); - Procurement phase; - Implementation phase; - Use and maintenance phase.

3. DATA ANALYSIS AND PROCESSING

During the analysis and processing of the collected data, it was taken into account how many and what kind of answers there were to the questions that were forwarded to the employees in the companies that were in the examined sample. The total data are divided according to the questions and the result is presented as a percentage. The form of the questionnaire is shown in Table 1.

Table 1: Questionnaire

Number	The Question	The Answer		
1.	Do you use computers in the company?	Yes	Partially	No
2.	Do you use adequate software to support the management of an industrial enterprise? (ERP)	Yes	Partially	No
3.	Did you find it difficult to master working with the new software?	Yes	Partially	No
4.	Has the use of adequate software in your work made your work easier?	Yes	Partially	No
5.	Are you satisfied with the fast and quality data processing	Yes	Partially	No

	by introducing an adequate information system?			
6.	Has the decision-making process been accelerated by these software changes?	Yes	Partially	No
7.	Are all business functions integrated with software support?	Yes	Partially	No
8.	Are business costs significantly reduced?	Yes	Partially	No
9.	Do new software solutions reduce administrative work?	Yes	Partially	No
10.	Are you satisfied with the new way of working?	Yes	Partially	No
11.	Has the market position of the company improved after the introduction of the information system as a support in the management of the company?	Yes	Partially	No
12.	Has the profit increased after the implementation of the information system?	Yes	Partially	No

By processing all the answers, statistically processed data were obtained, which will be presented in order of questions from the table. Respondents answered the first question exclusively with “yes” as shown in Figure 4.

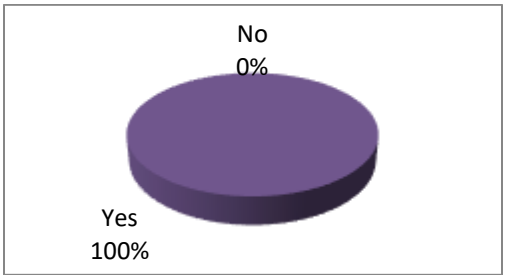

Figure4: Question number 1

In the second question, 70% answered "yes" and 30% with "no", which can be seen in Figure 5.

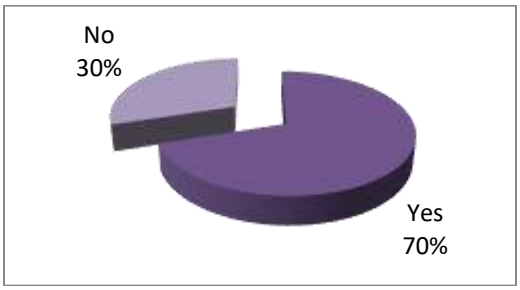

Figure5: Question number 2

The third question, related to the ability to master new software, showed that a good part of employees easily mastered the application of the new information system, 40%, while 35% partially mastered and 25% accepted the new way of working with greater difficulties, Figure 6.

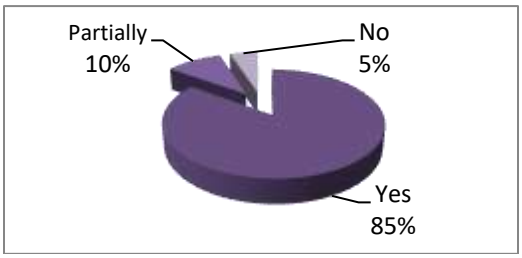

Figure6: Question number 3

When the fourth question came up, without exception, the answer was yes, 100%. The same goes for question number 5 and question number six, which proves that the introduction of the information system greatly facilitated and accelerated the work of all employees who participated in survey.

When analyzing the seventh question, it was found that in most of the surveyed manufacturing companies covered the entire business system information system and with 65%. Partially supported business system was found in 25% of surveyed companies and 10% answered "no", which in this case means that a small part of the business system is adequately software supported, Figure 7.

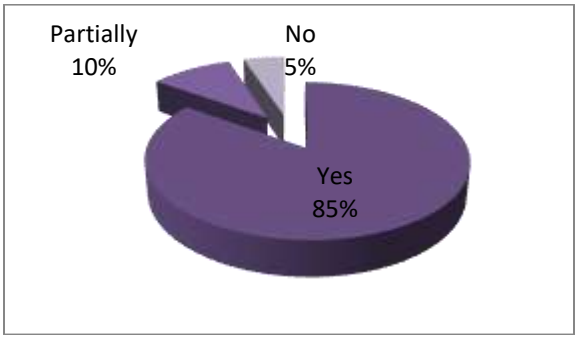

Figure7: Question number 7

Question number 8, which talks about reducing costs, undoubtedly proves that the surveyed companies have significantly reduced operating costs after the introduction of the information system. The share of responses is shown in Figure 8.

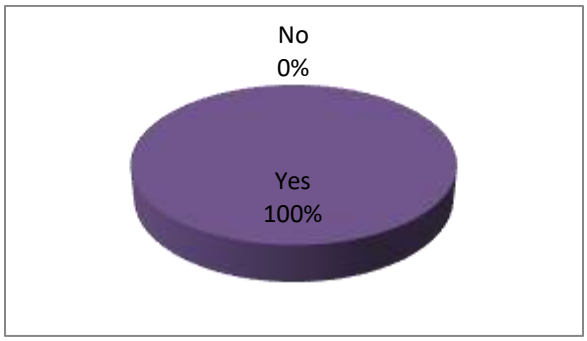

Figure 8: Question number 8

When analyzing questions 9 and 10, it can be unequivocally concluded that the employees think that the scope of administrative work has been reduced and that they are satisfied with the new way of working, which can be seen in Figure 9 and Figure 10.

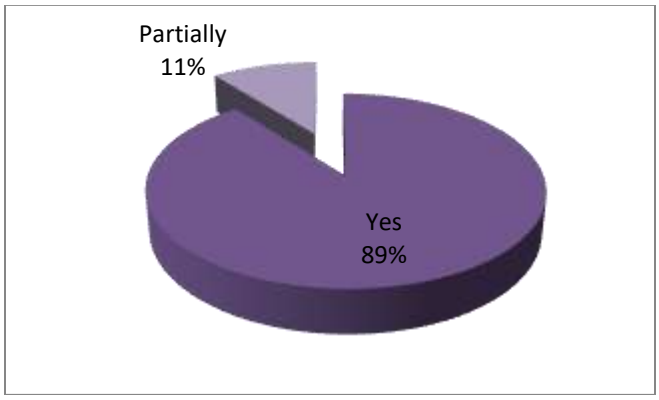

Figure9: Question number 9

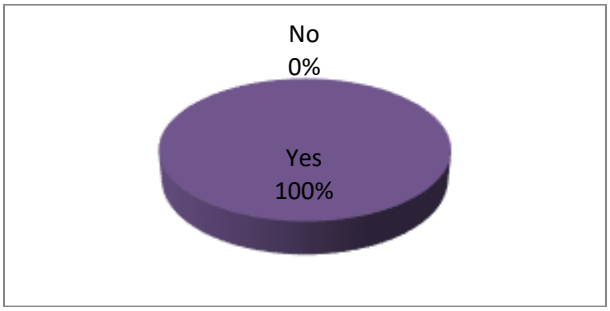

Figure10: Question number 10

When it comes to the eleventh question from the questionnaire, it can be stated that most companies gave a positive answer, as much as 85%, 10% partially improved their market position and 5% remained at the same market level, Figure 11.

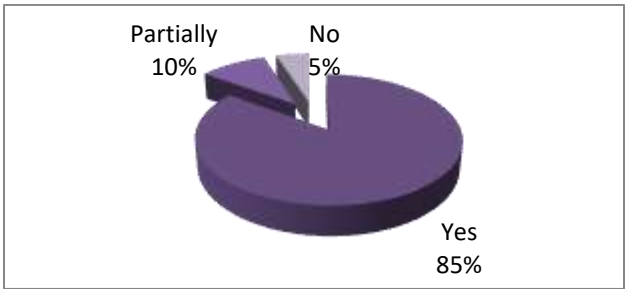

Figure11: Question number 11

The last question concerning the increase of profit after the implementation of an adequate information system in the company in 100% of cases received an affirmative answer, which speaks in favor of the hypotheses set at the beginning of this paper. Question 12 is shown in Figure 15.

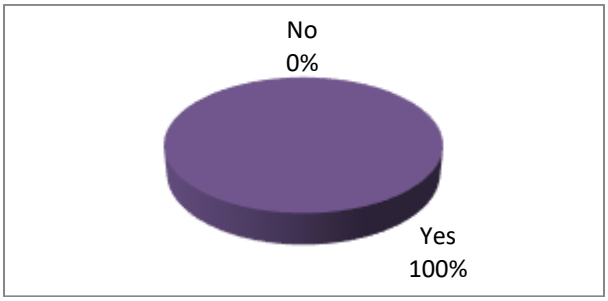

Figure 12: Question number 12

4. CONCLUSION

Based on the previous analysis of the research, it can be concluded that the initial hypotheses are correct. According to the analysis of the data obtained from the respondents, it can be seen that there is a dependence between the implementation of an adequate information system in the production company and its market position. Companies that have invested in the development of technology and information system have managed not only to survive in the market but also to improve their position.

Further, Operating costs have been significantly reduced thanks to the reduction of the workforce and the acceleration of many administrative tasks.

By analyzing the answers of the respondents, it was determined that the work of employees at all levels of the hierarchy was greatly facilitated and that the quality of the work itself was increased.

Based on all this, it can be concluded that the implementation of information systems in business systems is an imperative for their survival.

5. THE LITERATURE

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