The challenges of industrial automation in manufacturing companies in Kosovo

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Abstract. In the century in which we are living every sphere of life is moving towards automation and digitalization as well as the production of products and the creation of services. Industrial automation and the application of digital technology are opportunities but also challenges. This research was conducted in manufacturing and service companies in Kosovo. How many opportunities do automation companies give you and what challenges have they faced, Also in this research are analyzed how much knowledge companies have, for the new technologies that are applied such as: Industry 4.0, AI (artificial intelligence), ML (machine learning), 3D printer, 'Cloud' technology, VR (virtual reality).

Keywords: Automation, Industry 4.0., Digital technology.

1.INTRODUCTION:

Nowadays everything is moving towards automation. Digital technologies and automation are opportunities but also a challenge for the companies that use it. This topic has been chosen for research as there is little research of this nature in Kosovo and investments in automation still need to be made.

This paper reviews the literature on automation in general, the challenges of implementing automation and the opportunities that automation offers to companies that use it. The purpose of this study is to provide an in-depth analysis of the level of digital transformation (automation) of manufacturing enterprises in Kosovo and to research the views of their managers on the most important driving forces and obstacles to the implementation of automation.

The research topic is based on the automation challenges faced by Kosovar companies in the age of digitalization. But in addition to these challenges is the opportunity to create a competitive advantage in the market over other companies. In addition to the challenges, this paper will address the possibility with the research question: How has automation influenced the industry to have a competitive advantage?

Automation in the manufacturing industry has evolved from the use of basic hydraulic and pneumatic systems today's modern robots. Most industrial operations are automated in order to increase productivity and reduce labor costs. From the beginning industrial automation has made great strides among activities that were previously performed manually. A manufacturing enterprise that uses the latest technologies to fully automate its processes typically sees improved efficiency, the production of high-quality products, the reduction of manual work, and the reduction of production costs. (Lamb, 2013).

2.Industrial automation

Industrial automation is a multidisciplinary discipline that includes knowledge and expertise from various engineering sectors, such as electrical, electronic, chemical, mechanical, communication, control, and software engineering. Nowadays, the application of industrial automation has become a ubiquitous infrastructure that automates and improves daily life. Typical examples of industrial automation systems can be found in the automotive industry, the aviation sector, the maritime industry, the healthcare industry, rail transport, electricity generation and distribution, the paper industry, and many other applications. Our society has become so dependent on automation that it is hard to imagine what life would be like without engineering automation. With current developments in the field of industry 4.0, industrial automation has been unified with the concept of the Internet of Things, interconnected systems and physical-cybernetic systems, in order to create a vision-integrated ecosystem to enable clean automation for all aspects of life, for a future in which everything will be connected, integrated and automated.

Nowadays, the concept of automation in an industrial production process is a very attractive topic for electrical engineers, because it perfectly combines all the principles and methods of classical automatic control with microcomputer or microprocessor technology. The introduction of microcomputer technology in the field of industrial production, coupled with the development in the field of robotics, resulted in the creation of a special scientific field known as "automation and robotics". Although this field seems to be separate from "automatic control", this is mainly due to its great scope and not to the differentiation of its theoretical principles. The rapid development of automation and robotics in today's technological world has made it necessary for some time to place industrial automation and robotics courses in the curriculum of various departments of electrical and computer engineering. Each industrial production process consists of a series simple or complex machine through which the raw material undergoes a subsequent treatment to achieve the production of a final product, while fulfilling the goal of increasing production, improving product quality, reducing costs and increasing production flexibility. Initially, industrial automation systems were implemented in a conventional manner, i.e., with specific independent equipment (timers, counters, auxiliary relays, etc.), and their installations in accordance with the desired mode of operation. Today, the implementation of an industrial automation system is done on specific digital devices called programmable logic controllers (PLCs). The main feature of PLC technology is the need for programming (versus wiring) industrial system control logic. The many advantages of PLCs have made them the main tool for controlling an industrial system, but also for other non-industrial systems we encounter in our daily lives, such as traffic control for a road junction, a building elevator. , an automatic car wash, etc. (Manesis & Nikolakopoulos, 2018)

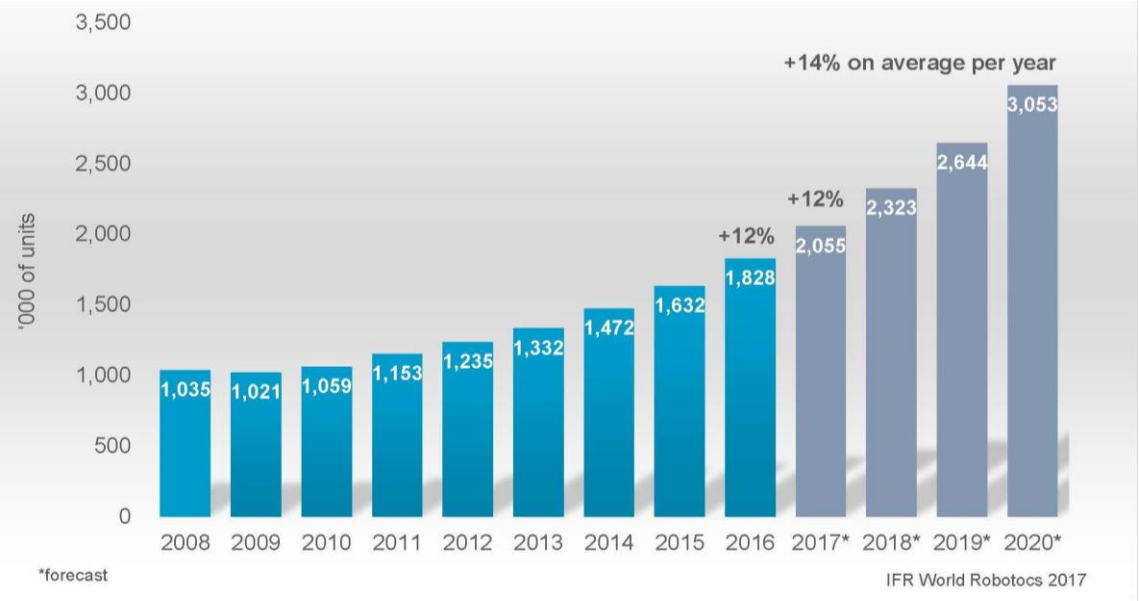

Figure 1 Use of industrial robots in the world (IFR, 2018)

3.Results:

Automation has had a positive impact on the entire production process of enterprises. It has also had a positive impact on competition in the market by enabling you to create a new product / service, reduce production costs, increase productivity, efficiency and effectiveness. However, the biggest challenge of automation for enterprises in Kosovo is the high cost of financing for production technologies, then the lack of skilled staff for the use of these technologies and the lack of business policies for institutional support.

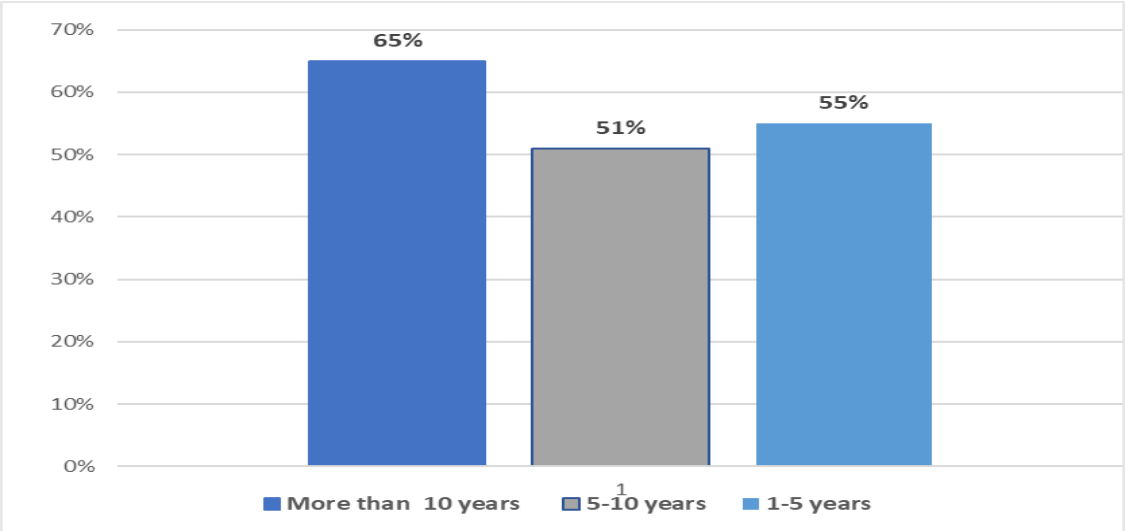

Figura 2 The level of automation

In fig.2. the level of automation is presented depending on the year of establishment of the company and as noted in companies which are older than 10 years the level of

automation is 65% is higher than the overall average of the automation level which is 58%.

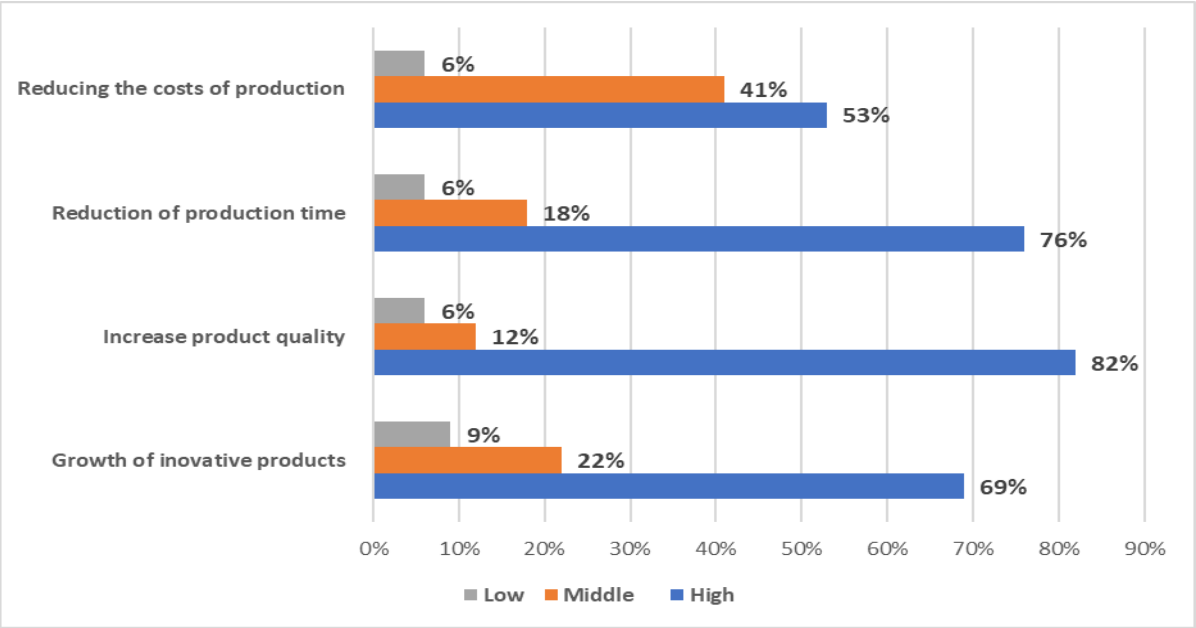

Figure 3 The impact of automation on the industry to have a competitive advantage in the market

In fig.3. the impact of automation to have an advantage in the market is presented. As can be seen, automation has a high impact on increasing the quality of production and reducing the production time of a product. As for the cost of production the percentage is lower because companies have to invest a considerable amount of assets in the beginning and therefore we have a lower percentage. While in the case of innovative products most companies think it is easier to produce a new product with new technologies.

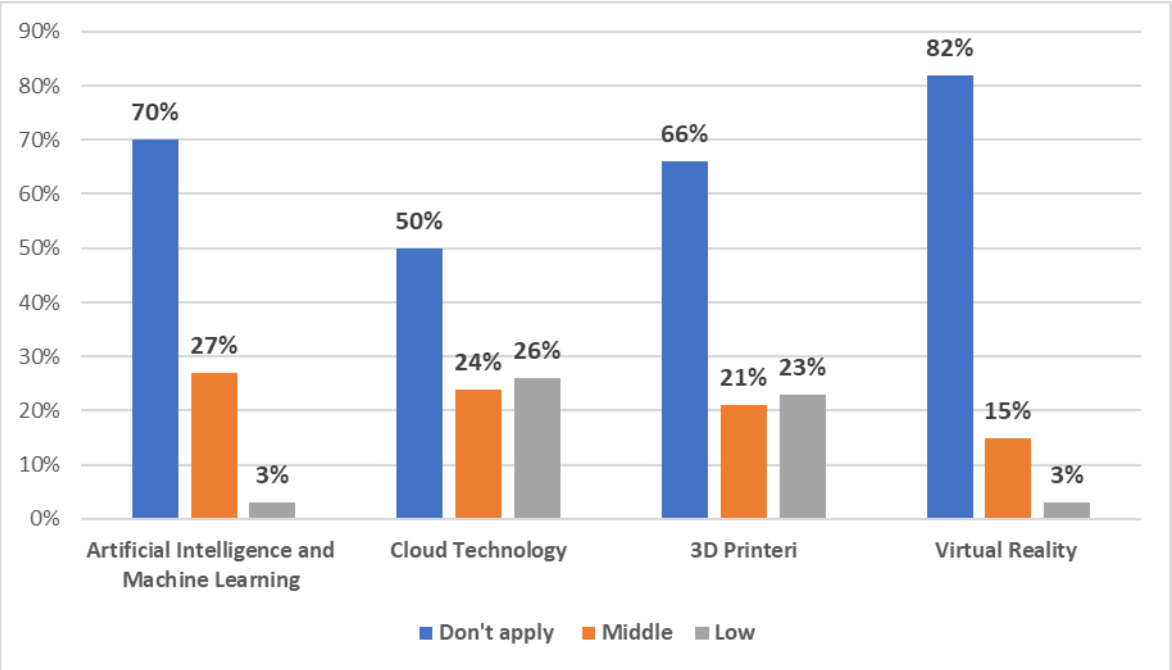

Figure 4 Level of use the digital technologies

Figure 4 shows the level of application of digital technologies, it is noticed that the level of application is very low which shows that the knowledge of these technologies is not at the right level. Newer technologies such as: virtual reality, artificial intelligence and machine learning find very little application in our companies which shows that with trends in technology still need to make higher investment and start applying them.

4.Conclusions:

Technology has made great revolution in every field of life. What is noticeable is that with the advancement in technology to stay in the market (competitor) is what companies most adapt to the changes and trends of new technology.

-Automation and new technologies have made: to reduce the production time of products, to have higher efficiency, efficacy and productivity, to offer new products and services and also to create new sales bridges with customers around the world.

In terms of use and knowledge about new technologies such as: Artificial intelligence, 'machine learning', Virtual Reality, 3D Printer, Cloud technology level is not very satisfactory, very few find application in our companies which shows that with the trends in technology a higher investment still needs to be made and started to apply.

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