

Value-ADDED Automation, a Solution for the Future of Work in Automotive Manufacturing in Romania

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Abstract

We argued in this paper that the Romanian automotive manufacturing industry needs a disruptive change in order to sustain GDP growth. How to add value in the production and management process through automation and robotization? Based on main author's years of experience as General Manager in different international automotive companies in Romania and critical review of the international literature the article attempts to build solid foundations for a possible future of work in the Romanian automotive manufacturing industry. With already existing technologies, today one third of the activities in an automotive manufacturing plant in Romania could be automated. In order to maintain a fast-growing GDP rate, Romania cannot rely anymore just on the best cost and available qualified and unqualified workforce on the labor market. The speed and extend of automation and robotization of the manufacturing processes depend on several local factors.

Keywords: *value-added, automation, automotive, manufacturing, Romania.*

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1. Introduction

Management problems can be differentiated according to their duration or deadlines, according to Reese (2016). For operation managers in Romanian automotive plants, one of the daily tasks is to increase the productivity per operator also called “direct labor”. Due to lack of new ideas about how to get an operator to work faster or more efficiently, we have seen a stagnation of productivity increase in the last years. Because of an empty labor market and of the new human operators’ lack of willingness to work at an always increasing pace, wages were increasing faster than productivity leading to an increase in the unit cost. This is currently a very specific situation for the Romanian labor market.

Operation managers must find new ways of increasing productivity not based on a short-term target but on mid- and long-term benefits. By defining precisely what value-added means to an automotive factory, it will be easier to describe how to boost it. A general productivity increase for the Romanian automotive industry is also necessary to keep a high rate of GDP growth.

The author considers that one of the most promising solutions is to use the recent technological advances in order to increase the automation level in Romanian

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automotive factories. Automation is an engine of productivity which could transform automotive manufacturing in Romania for the next decade. As the Romania's demographic situation is getting more complex with ageing population and young and active people going abroad to work, increasing the value-add content by investing massively in automation even in countries appreciated for their best cost labor is an interesting study to perform. We want to contribute with an academical approach about the competitiveness of Romanian factories where labor is no longer cheap and no longer available in unlimited quantity.

Due to several internal and external factors, managers of Romanian automotive factories need new ways to increase productivity and value add in a complex demographical situation and increasing international competition, too. The competition is coming on one hand, from companies in countries with cheaper workforce, and, on the other hand, from companies in countries with higher productivity and high value added.

In order to identify the solution, the research process went through the following steps, as follows:

1. To analyse the actual situation of the Romanian automotive factories
2. To analyse the actual situation of the labor market in Romania
3. To define what is value-added.
4. To define which factors are influencing value-added for automotive factories.
5. To analyze the possible effects of a higher automation level for Romanian factories.

The main contribution of this article is to show the actual technologies in Romania, as two thirds of these activities could be automated. Automation is the only possible way for Romanian automotive factories to keep the pace with factories in advanced countries.

The article structure is as follows: we start with a new approach and definition of what value-added is for automotive customers. After defining value-add in an automotive factory, we will analyze how to maximize it as much as possible.

The article concludes that automation is the best way to increase value-add and productivity for Romanian automotive factories. This finding is possible thanks to disruptive technologies and the nature of work in Romanian automotive environment, which is mainly physical predictable work and data collection.

2. The Romanian context

Today, the Romanian automotive industry starts to struggle with demographical and geographic issues, as it was the case for Western Europe automotive industry twenty or thirty years ago. There is no longer enough incentive to invest in new automotive factories in Romania. The latest investment from global actors in the automotive industry for a greenfield production plant is already more than three years old. Tesla invested in Eastern Germany for the European footprint of the carmaker, Cooke (2020). This investment is a first indicator for the future of

automotive industry in the next ten years in Europe. Another trend is the scrapping of new greenfield automotive plants, for example, BMW stopped the plan to build electric vehicles in Hungary, Haider (2020), Volkswagen is doing the same for the planned new greenfield in Turkey (Covarrubias & Pérez Sigfrido, 2020; Guzik, Domański & Gwosdz, 2019).

Additionally, the political and tax uncertainties in Romania (Grigorescu, 2019), coupled with the ageing and shrinking population (INSEE, 2017), are powerful arguments for any new automotive investor to avoid enter the place. The first investors, already in the place for more than a decade, have relocated their manufacturing activities outside Romania or are shrinking their local footprint. For example, Nestle (2019) relocated the Timisoara plant to Hungary, Delphi closed its manufacturing plant from Moldova Noua, Romania, due to lack of workforce. Other automotive suppliers are reconsidering their future investments in Romania due to several factors such as: lacking trust in policy makers, unfavorable situation on the labor market and increase of the cost of labor faster than productivity.

Since 2018, our own observations indicates that Romania is not anymore considered a best cost country for automotive companies. Even if the salaries in Hungary are higher, Romania is losing most of the benchmark analyses realized internally by many automotive manufacturers due to lack of productivity and added value in the production stream. Suppliers and Original Equipment Manufacturers (OEMs) started already to delocalize to North Africa, especially to Morocco.

Consequently, to avoid losing more automotive market share in the next decade, Romania must reconsider the importance of adding value in the automotive factories and find a solution to increase it. We suggests that automation of manufacturing is an important factor for increasing productivity and value-added for the Romanian automotive industry.

Employment generation is crucial for the Romanian economy. Yet, the Romanian automotive manufacturing is facing automation and value add technology in opposition with best cost local production reputation of the past.

Various international agencies have recently flagged issues and potential for the future of employment, and the consequences of automation and deindustrialisation and relocation in their global reports (ADB, 2018; Hallward-Driemeier & Nayar, 2017; ILO, 2017; IMF, 2017; UNCTAD, 2017; UNDP, 2015; UNIDO, 2016; World Bank, 2013, 2016) and the International Labor Organization (ILO) has launched a global commission on the future of work.

Also, in the scholarly community there is a significant and rising interest (Acemoglu & Restrepo, 2017; Grace, Salvatier, Dafoe, Zhang, & Evans, 2017; Mishel & Bivens, 2017, Mokyr, 2015, Munteanu A.I. et al., 2020, Bibu N.A., 2008). The World Bank (2016, pp. 22f.) estimates that „the share of occupations that could experience significant automation is actually higher in developing countries than in more advanced ones, where many of these jobs have already disappeared”.

Today, Romanian automotive industry is producing with state-of-the-art equipment in factories, which are younger than the average factories in advanced countries. The product mix in Romanian factories is usually labor intensive, with

high quantities products and less flexibility. Romania has a modern automotive production infrastructure but also a high amount of people due to past cheap labor reputation and abundant labor market. We consider that increasing the added value is the right way to manufacture products for the local based and labor-intensive automotive industry in Romania in the current context described above.

3. The importance of Added-Value

In the current period, original equipment manufacturers (OEMs), which are the main customers for automotive suppliers, value means “only good quality products, at the right time and at the best cost”. An original equipment manufacturer (OEM) traditionally is defined as “a company whose goods are used as components in the products of another company, referred to as a “value added reseller” which then sells the finished item to users” (Kagan, 2019, Gabor M.R., 2021, Minculete, Gh., 2013). An OEM manufactures customized products based on the VAR company's needs and specifications. Today, most of the Romanian automotive industry is producing very high amount of simple automotive components relying on a high number of operators. This production model is more and more difficult as automotive parts are getting more complex and the diversification is increasing, too. For example, OEMs, such as the Volkswagen Group or Renault-Nissan are expecting to receive complete systems from their suppliers and not only single components, as before. This is happening because OEMs want to reduce the complexity of their supply chain and cut their acquisition costs.

The pressure on costs is very high. To meet the assumptions of the OEMs and to remain competitive, Romanian automotive factories need to improve productivity and added value in the production and reduce at the same time the cost of labor. They need to reduce the cost of labor in order to increase the productivity measured as “output of parts per operator” but also to avoid having to hire or replace people on an imbalanced labor market short of available people for hiring. Consequently, we suggest that the best way to increase added value and productivity in the Romanian automotive industry is to invest in automation and robotization.

4. Most of the automation studies focus on high-cost countries

Most of the recent automation studies focus on high-cost countries (McKinsey Global Institute, 2017). The authors are expecting a faster implementation of automation there, as it is capital intensive. The return to investment is faster at a higher wage level. Our article is evaluating the effect of automation on the Romanian automotive industry, which was not in the focus of the global studies until now. The Romanian automotive segment needs to redefine a new strategy for the next ten years until 2030. Romania is an emerging country belonging to the European Union, which needs to increase the economic growth faster than his direct neighbours to keep the pace with advanced European economies.

We consider that, due to technological automation advancement, many current activities in Romanian automotive plants already have automation potential today. The capital expenditure necessary to finance automation is mostly done to accelerate or slow-down the speed, range and automation level. Advanced economies started to automate their activities in all the sectors earlier than emerging economies having a best-cost workforce as competitive advantage. Therefore, it is highly possible that robots in high-cost countries could soon defeat cheap labor from emerging countries. The recent evolution of automation and the possible practical adoption is an unprecedented change of direction for globalization. In conclusion, Romania and the local automotive industry cannot miss the early automation of the labor-intensive industries in order to maintain their international competitiveness and economic growth.

5. Change in technological barriers

Today, humans are part of a fast speeding society, always looking for more possibilities to save time, due to new digital technologies and digitalization of the society and organizations. “We still have the impression that we must run faster” (Rosa, 2017). The advances made with existing Artificial Intelligence (AI), robotization and machine learning applications are displacing frontiers for the automation roadmap. We are now regularly pushing farther away the frontier between what we think the machine can do and its real potential which is higher than some or most of a human being abilities.

We have witnessed, for a while, robots taking over physical tasks in factories. Now robots are conquering the service sector, improving over the years as their human co-workers train them. For example, some restaurants even in Romania start to use servicing and cooking robots to grill burgers, prepare French fries or every kind of Asian food in a wok (<https://misorobotics.com/>, <https://www.spyce.com/>).

Besides, there are also significant technological advances in executing cognitive tasks, (Deloitte Insights, 2020). Software programs have been able for decades to perform better banking transaction or route optimization for material and finish goods transportation companies. Artificial Intelligence (AI) is redefining the frontier of several activities, which could only be solved based on human qualities, as experience and judgment. For example, the Romanian company UiPath offer complete robot process automation (RPA) solutions, which is dividing by 10 the number of manual data entries for the outsourcing center (Anagnoste,2017), automotive companies or public institutions.

The recent development and perfection of key technologies will affect every workplace in Romania. Most of the advances described previously have practical applications in the labor-intensive Romanian manufacturing industries. Thinktanks and organizations like the World Economic Forum, (Fleming et al., 2020) are forecasting major improvement in productivity and value-added due to automation.

Romania has great advantages to succeed in the automation of the automotive sector. First, Romania is a member of the European Union: As in the future, robots will replace more and more the cheap workforce, the geographical proximity to the final customer and flexibility to adapt the product/service portfolio will be essential. Second, is its large manufacturing footprint: Romania has attracted in the last 20 years huge investment from international automotive suppliers and, consequently, the automotive footprint is state-of-the-art. Companies need and are capable to add more value to the manufacturing process by increasing the percentage of automation of the workplace.

Third, it is the demographical dire situation: the Romanian population is getting older; a lot of young unqualified workforce and students have left the country for several reasons. The lack of best-cost workforce and the need to pay better-qualified students/employees to be competitive with developing and running new technologies is actually helping to increase the pace of automation. The example of Mexico (another important country for the automotive industry) is very significative. Because of its young and unqualified population and the difficulties to cross the border to the USA, the hourly wage in Mexico is remaining low. The pace of automation in Mexico can be lower than in Romania, where the structural advantages are gone (no unemployment, high wage increase without productivity increase).

Romania will also need to face several challenges, as it follows. First, Romanian owned companies must invest more in automation, taking into account that this strategy will reduce their short-term profitability. Second, a much better absorption of European and international funds is needed in order to achieve an acceptable infrastructure level.

Third, the educational system plays an essential role in accompanying the digital transformation and robotisation by bringing the right skilled people to the labor market or retraining them. Today it is difficult to think you will do the same job for 20 years. Manyika et al. (2019) estimate that about half of all the activities executed by humans in the world workforce could potentially be automated by adopting currently demonstrated technologies. For example, “62 million full-time employee equivalents and more than 1.9 trillion in wages are associated with technically automatable activities in the five largest European economies (France, Germany, Italy, Spain and the United Kingdom)”, (Bughin et al., 2019)

Fourth challenge is that manual activities are higher represented in sectors like automotive factories, restaurants, food or drink serving industries, hotels and retailers. These sectors are still having a higher proportion of the global Romanian economy than in the average OECD countries: our best estimate is that 2/3rd of the workplace activities of the Romanian economy have the potential to be automated today by adapting currently existing technologies. While only a few jobs can fully disappear with automation solutions, most of existing jobs have a minimum of one third automation potential. Manual activities and running machines in a defined and less changing environment or working with datasets have a high technical potential for automation. The automation potential for creative activities, or activities requiring expertise, decision-making and coaching, is still very low.

Fifth, while the technical potential is very important, the level of wage per hour is also highly important. The McKinsey Global Institute (2017) estimates that over \$1 trillion in wages could be economically automated with a technology cost of \$20 per hour, and \$2 trillion could be captured with an automation cost of \$10 per hour. We estimate the average wage per hour, for the Romanian labor-intensive automotive factories, at \$5 per hour. The combined effect of artificially increased minimum wages and the competition with other automotive countries with more automation or \$2.5 wage per hour will increase the need for Romania to use more robots in production.

Therefore, we consider that automation is a rescuing solution for the Romanian economy to close the GDP growth gap. During the last 30 years, employment growth and productivity were the main contributors to GDP growth in Romania. However, considering the declining birth-rate and as described before, the ageing Romanian population, the peak of employment in Romania could occur before 2030. The aging population will create a rising economic growth gap for the country. If we consider an equal share for employment growth and productivity increase as a contributor for GDP growth, one of the two pillars of economic growth will disappear in Romania very fast. To keep the actual GDP growth, the productivity has to increase two times faster by adding automation at the workplace.

Robotization can bring Romanian GDP to the next level. Automation and robotization will change the needs from the local labor market for automotive factories: some jobs will disappear, some jobs will change, and many new jobs will be created. One of our findings is that 20 to 40 percent (depending on the pace of adoption) of the hours worked in automotive production in Romania could be automated by 2030.

6. Conclusions

Automating the labor-intensive automotive production can enable productivity and added-value growth and other benefits for the manufacturing process and for the whole businesses. Added-value increase is surely needed, especially in Romania where the working-age population is leaving the country or is aging; robots and other automation measures are part of the problem solving to keep the economic engine running and keep the pace with G7 countries.

Automation does not only contribute to keep labor cost under control but also to improve the overall production standard of a factory by increasing throughput and output, ensuring a reliable quality, and better OEE and decreased downtime. There is a lack of labor force in Romania to perform quality and visual control. The solution is having a more robust and automated production process.

The Romanian automotive factories in addition to robotisation and automation are looking for the same or a higher number of people working to overcome an ageing population and get the higher quantity products in time, which will come from the regained competitiveness.

Romanian automotive workers need more professional training and also to increase their affinity to machines, automation, computer, and robots. All employees and especially operators will be surrounded by machines and robots in the future, they will need to work closely with new technologies. A closer integration of technology will allow operators, line leaders and managers to focus more on adding value to the product, to train employees, to stimulate creative activities and develop expertise where they use skills which machines do not have yet. When young people start education and career choice, it is more and more important for them to identify the factors driving automation and identify the skills useful for them to acquire for perspective on the future Romanian labor market.

Employees with high level of expertise and coaching quality are having experience in co-working with machines and robots will be in good position on the labor market. Middle-skilled Romanian workers (collecting and analysing data, predictable physical activities) will be under the highest pressure coming from automation. They need to go back to school, private education or training on the job to acquire new skills, which are relevant to work closely with a machine. They will need to analyse therefore the shifts in their activities, and where automated machines will be better, faster, and more efficient compared to them.

Low-skill workers are keeping the advantage that under a certain wage level, automation is not profitable. In this respect the functional congruency refers to the match between stakeholders' expectations regarding the implementation of a social responsibility code and their perceptions on how an organization or system is assessed from the social perspective (Cristache et al, 2019).

Due to lack of new best-cost workers on the Romanian labor market and the increasing demand for zero defects in the automotive industry, there are additional reasons to switch to automation even if there is no pressure on wage.

Romanian education system will need to prepare employees for new changed workplaces, and to improve their skills in the technological and scientific fields, coaching and business administration; creativity and critical reasoning; system thinking and giving feedback. Agile thinking, flexibility and open mind are essential in a transforming automotive factory (and in the society at large).

Romania went very fast through the industrial revolution in the last 30 years. The economic transformation that happened in France, USA or Japan over the last hundred years only really started thirty years ago in Romania. To keep the pace of economic growth, Romania has to start the process of automation this time faster than its neighbours. Without early adoption of automation, Romania will lose a big part of the labor-intensive automotive factories to Ukraine, Serbia, Turkey, North-Macedonia, and North Africa for example. Later, these countries could lose back the entire automotive manufacturing industries to advanced countries, which will go for more automation, too.

Automation is the most important factor to improve the added-value content in the Romanian automotive industry in the next decade and to overcome demographic challenges due to missing and decreasing of the active population.

There are different scenarios about the range and extent of adoption of automation technologies in Romanian factories. It is possible to see unexpected developments. We will see bigger changes of activities from an old and manual workplace to a partially and then fully automated workplace. These trends are already under way in Romania in less labor-intensive activities like Global Business Service or IT. Policy makers, public sector, business leaders and workers do not need to wait; they can already prepare today for what will be a necessity tomorrow. They can capture the opportunities offered by automation to add value, increase productivity, and keep one of the fastest economic growth in Europe during the last 5 years.

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