Automated system should replace human resources to increase productivity in modern industry

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The modern world has become more tech-driven. Nowadays, Robots can do tasks which were previously seemed not doable by many. Technology is expanding rapidly and making a lot of advancement in fields such as Automation, Robotics, Artificial Intelligence, and others. With the evolution of Artificial Intelligence, many researchers fear that in recent future AI will replace human in every field possible. Research conducted by Grace, Salvatier, Dafoe, Zhang and Evans (2018), asked few questions among prominent specialists in the field of Artificial Intelligence where the specialists expressed their opinion about when AI will outperform human. Researchers believed AI will be able to do many tasks like human such as language translation, essay writing, truck driving, book writing, retail works, surgery and many more within the next 40 years. It is predicted by researchers that there is a 50 percent chance of AI doing tasks better than human in 45 years and within 120 years all human jobs will be automated. The main focus is that AI can do many complex tasks in the future which will replace human jobs. One such field would be the industries in the modern world.

Industries in today's world are focusing more and more towards profitability. One of the many important factors in achieving more profits is through increased productivity. The more one company can produce the products, the more user will buy it. Also, the product is constantly changing to keep up with the ever-growing consumer market. Based on the research done by Li, Landstorm, Mattson and Karrlson (2014), the goods sold to customers are inclined to alteration more quickly with a lot of models and variations in the modern world. This diversities in product families make ramp-up time necessary for the productivity of the production and profitability of that product. Among the many reasons behind high product variations is mass-customization, that is the strategy to deliver customized

merchandise to a price similar to products that are factory-made. Assembly system is compelled by Mass-customization to take care of high adaptability, small batch size, small product amount and a high variation at a minimum cost. This means that industries always look for new ways to capitalize on their investment and their products are constantly changing. In order to reach maximum profits, industries focus on reaching to as many customers as possible. The more one can make the product with better quality, the more one can reach to the mass customer. Thus, increasing profitability largely depends on productivity.

One of the many problems in the industries to increase productivity is workspace inefficiency. Currently, industries are largely operated by humans. To keep up with the production, industries split the work hours into different categories. There are also scenarios where the machines broke down due to incapable handling by humans. The work qualities largely depend on person to person, not every person have the same skills in work. Also, managing human worker is sometimes difficult for the management. Another such problem would be spending cost in industries. Industries spend a lot of money on raw material and workers. It can be further cut down using the automation system. According to Rüßmann et al. (2015) within next five to ten years Industry 4.0 will be embraced by the companies, increasing productivity across all German manufacturing sectors by €90 billion to €150 billion. Cost of materials is excluded by productivity improvements, ranging between 15 to 25 percent. Productivity gains of 5 to 8 percent will be gained if the material cost comes to the equation. These improvements will be varied from industry to industry, for example – 10 to 20 percent increasement is expected from automotive industries. So, automation will help industries to dominate the market space through increased productivity. This shows the potential for automation in the industries.

However, there are some people who argue that the automated system will make people jobless although this statement is somewhat accurate. Another group of people is arguing that automated system increases skillful workers and their wage as well. There will be a displacement of jobs and human workers can focus more on meaningful creative jobs. Also, the demand for non-automated job would be higher. There are a lot of papers which concur that automation creates more non-automated jobs, humans can focus on creative meaningful jobs, and the job demand is higher than automated jobs. As stated by Bessen (2018), "Automation might not cause mass unemployment, but it may well require workers to make disruptive transitions to new industries, requiring new skills and occupation" (p.2). According to Acemoglu and Restrepo (2018), displacement effect due to automation in workspace contributes to scaling back the demand for labor and wages. But it is neutralized by a productivity impact, ensuing from the value savings generated by automation. This increment the demand for labor in non-automated tasks. Another research conducted by Chui, Manyika and Miremadi (2015) found out that as the automation of physical and knowledge work advances, many jobs will be redefined rather than getting eliminated. The economic benefits of automation go far beyond than just labor wage savings, it will free up the human from doing menial works and human can focus more on the important tasks. Automated system will do the simple tasks and human will focus on more higher works. (Bessen, 2018; Acemoglu & Restrepo, 2018; Chui, Manikya & Miremadi, 2015)

Automated system can solve many problems that have been preventing productivity in industries. Therefore, Automated system should replace human resources in industries to increase productivity because automated system will increase workspace efficiency, improve process optimization and save cost.

Increase workspace efficiency

One of the reasons behind automated system replacing human is because automation increase workspace efficiency and with it boost productivity. Humans are prone to error, this error can lead to the failure in types of machinery in industries as well as imperfect defected product. Automated system, on the other hand, completed the task without errors. According to Mohd Aiman Kamarul Bahrin, Mohd Fauzi Othman, Nor Hayati Nor Azli, Muhamad Farihin Talib (2016), large improvements in product quality and less error rate can be achieved by combining product development with digital and physical production. Sensor data can be used to check defect for each produced product and error correcting machines can work on fixing the product at the same time. If all defects products can be eliminated, European top 100 manufacturing companies could save the cost of reworking defected products or scrapping. This largely shows the impact of defect products on industries and how the companies can improve productivity as well as profitability by implementing automation. Thus, incapability of human workers can be removed from the scenarios using automated system in industries.

In addition, human takes a lot of time to get trained for a specific job. Current industries are constantly changing and with it changing the scale as well as roles of jobs. In those scenarios, it will take more time to train humans. Also, industries have to spend money to train and hire skillful workers. Chui, Manyika and Miremadi (2015) stated that automated system can analyze raw data along with natural language processing which helps them to write reports with few seconds. Kiva robots from Amazon and IBM's Watson are the examples of automation system doing tasks faster than humans without any prior training. In another part, the authors estimated that 20 percent of a CEO's work can be automated. From above, it can be concluded that most of the tasks which require training for human, now using

automated system those tasks can be done quickly. Therefore, automated system help to get rid of training and increase productivity as well as profitability in the industries.

Moreover, automated system can optimize resources far better than human. Automated system enables maximizing the use of resources and create better products for the industry. Also, automation provides the option reusability to the industry. According to Mohd Aiman Kamarul Bahrin, Mohd Fauzi Othman, Nor Hayati Nor Azli and Muhamad Farihin Talib (2016), smart factories can tackle board information and communication technology for expansion within the supply chain and production line that brings a far higher level of automation and digitization. To deliver immensely superior cost efficiencies and better product quality item and services, automated system using self-optimization, self-configuration and artificial intelligence are used for completing complex tasks. This explains that automated systems have the capability to reuse themselves. Expansion of the supply chain means more productivity which also means more profits for the industries.

Furthermore, automated systems can do tasks faster and more accurately than humans. Humans also cannot continue doing the same task for a long time. The maximum work hour for humans is only eight hours whereas for automated system the work hours is twenty-four hours. Even so, during those eight hours human still need breaks. On the other hand, automated system can work the whole day without any break. Mohd Aiman Kamarul Bahrin, Mohd Fauzi Othman, Nor Hayati Nor Azli and Muhamad Farihin Talib (2016) showed in their research how a plant can operate twenty-four hours without any break using automated systems. Automated system increases productivity by increasing uptime for the industry. Thus, increasing profitability for the industry. In addition, the supply of the product is not consistent with humans. The total amount of production made by humans varies from day to day. Humans also cannot make use of the resources properly on the factory floor. Automated system is far more superior than human in this field. One such example on how to

increase the efficiency of logistics on the factory floor is given by Rubmann et al. (2015) where, transport vehicles with automation will work with consignment robots to modify in-bound materials based on real-time analysis data. The movement of these vehicles are controlled by laser navigation and communication is done using wireless network. The proper materials for upcoming processes will automatically be identified and selected by consignment robots. Using such logistics on the factory floor will generate greater cost savings which is 50 percent for the manufacturer. From this, it can be understood that automation system can efficiently work with the resources given. By working efficiently on the factory floor, automated systems increase productivity and profitability for the company.

To sum up, automated system can work faster than human, work longer hours than human, does not need any prior training before work, keep up with the same supply every day, reduce the error rate, optimize resources better than human. All of these leads to an increase in productivity. Thus, it can be said that automated system will increase productivity and should replace human in modern industry.

Improved Process Optimization

Process optimization is a significant factor which will drive the industries toward productivity and profitability. Production processes and systems are imperative for the industries to operate more effectively. Piero (2013) mentioned in his writing about the necessity of production processes, the man started to realize production processes and systems are more efficient and convenient for the business organizations. It helps to diminish parts of the processes which takes more time. Thus, process optimization is crucial for the businesses. One of the dynamic ways to improve process optimization is through exploiting automated systems. Automation enhances process optimization through advanced information gathering and analysis of gathered data as well as through visualization.

First and foremost, automated system has the capability to collect the data which makes the work easier for the industries. It offers industries a better solution rather than gathering information manually by human which will be a waste of money and resources. Piero (2013) suggested:

> Making information gathering and access to data bases immediate, thereby increasing their quantity and variety, improves the decision-making process, facilitates the execution of tasks, and avoids errors that require control, with a consequent savings in labor time in every phase of the production process. (p. 257)

The author explained how advanced information systems can help the industries to increase the product variations as well as the amounts of products. Thus, information gathering has a massive role in optimizing processes. Additionally, Piero (2013) also mentioned that, products and processes designing based on combined criteria, materials and components utilization with specific pre-defined standards make the product more efficient, assembly works becomes more accurate and faster, quality restoration is also reduced, thus entire production system productivity is increased. Therefore, pre-defined standards in automated system can help achieving more productivity through speeding up the work, reducing errors as well as reducing quality restoration measures.

Furthermore, process optimization can be done through storing the data about products into data center and those stored data can be analyzed further to see what has been done in wrong ways. Next, the industries can make proper amend to the product which will increase product quality. According to Nimawat and Shrivastava (2016), automated systems increases the prospects of evaluating the reason behind minor productivity by providing effective data of the machine. The data of the machine can be stored in data center and the industries can later analyze the data to see in which area they need to improve. Specifically,

this will help the industries to improve in the area of inadequacy and increase both the quality and quantity of the products which will direct towards accretion on productivity.

In addition, automation provides the opportunities of visualizing the whole production scenario before beginning the manufacturing process. Visualization helps to reduce costs, detecting problems in processes or products and speed up processes. Rubmann et al. (2015) illustrated that Siemens and a German vendor used a virtual machine to simulate the machining of parts using data from the actual machine, the result lowers setup time for the physical machining process by eighty percent. This shows that visualizing the production scenario beforehand helps the companies make necessary changes to the original products and produce the product much quicker.

In summary, advanced information gathering, data analysis and data visualization guide the industries in the direction of process optimization. Process optimization leads towards more productivity. Automation is one of the advanced tools available through which process optimization can be achieved and in effect productivity will increase.

Saving cost

Industries can improve their productivity in a lot of means. A vital way would be saving money and using those money on something more important. Industries can oust some human resources with automated systems which will benefit the industries by reducing cost of their operations. In turn, including technologies like automation brings more productivity. Some people contend that lower labor rates means higher productivity, however this statement is not true. One of such examples was given by Borkes (2014), in eighteenth century England had lower labor rates than America, still America had higher produced and exported manufacturing items quantity per capita. The available technologies were behind the cause of worker productivity improvements. This debunks the argument of lower labor rate leading to better productivity. In effect, technologies such as automated systems will

contribute to high productivity. Additionally, safe workspace can help the industries to save money and gain productivity improvements.

To start with, industries require proficient workers to manufacture better quality products. However, human workers are not as adept as automated systems. Borkes (2014) presents an example where he compared between human workers and automated system, automated system is much inexpensive than human workers while building a product. Also, automated system enabled the wage of workers to be higher than companies without automation. To illustrate, automated system is far cheaper than human workers. Furthermore, Automated systems are programmed to use maximum resources available to make the products. In contrast, human workers cannot maximize tasks while automated system is able to maximize all surrounding resources. According to Nimawat and Shrivastava (2016), automation makes the cost of product minimal by improving power saving prospects. In addition, Workflow automation will help lower labor savings and costs, automated system will save supplies and toner by avoiding re-adjustments to the product. Also, semi-automated workflow will help optimizing usage of equipment and capacity increasement. For instance, there are a lot of areas where the task can be fully automated or semi – automated. Implementing automated system in industries can reduce power consumption, lessen the production price, avoiding reprocessing of products, achieving optimum efficiency of the system.

Moreover, in dangerous environment, the life risk is high. Automated system can help to solve that issue. Automated system can substitute humans in hazardous environment. Macpherson et al. (2013) mentioned that the aim behind drilling-systems automation is productivity and quality increment, worker safety improvement, managing risk adequately. Additionally, safety is one of the primary concerns for rig automation, which includes workers must stay out of hazardous area. Drilling is one of the most threatening environments

to work in. A lot of lives have already been claimed by drilling in oil rig. Automation is already enforced in drilling work to ensure safer workspace environment. The industries must bear the cost of damage if there is accident in the workspace as well as the cost of fixing broken machineries. Specially in dangerous situations, if workers met with an accident, the companies need to pay the cost of medical treatment as well as rehabilitation for those workers. Furthermore, the workflow of the industries will be interrupted due to the accidents and will have negative impact on productivity. Also, the author later mentioned, one of the value propositions from drilling system automation is the value generated by automated system after frequently executing a repeated task at the similar speed without any deviation which results in large savings over a certain period. (Macpherson et al., 2013) This further illustrates that automated system not only ensures safe workspace but also provides productivity and profitability.

To sum up, automated system helps to reduce costs and ensure safe workspace environment. Safe workspace reduces the cost of accidents, cost of insurances of workers involved in the accident, cost of fixing the broken materials and others. Industries can save money and spend on maintaining the automated systems or other sectors which will aid the industries to boost productivity.

In conclusion, automated systems have a lot of advantages over human in modern industry. There are a lot of perks having automated system in industries, most of them contributing towards the goal – productivity and profitability. Nimawat and Shrivastava (2016) stated, for the following reasons automated system is one of the most compelling approach – cost decrement by getting rid of waste as scrap, scaling down manpower, shortening time, controlling quality and enhancing performance of processes or systems in any industry with the total assertion of large profit surplus each year. These causes lead industry towards more productivity. Also, the safe workspace is a must place for adapting

automated system in order to assure the safety of human workers. Automated system ensures better quality products in high quantity and in lower cost for the consumers.

In addition, industries should be more open-minded and look at the advantages of automated systems. Automated system should replace human in those sectors where it can be fully automated. However, there are still some tasks which cannot be automated and required human workers. In those scenarios, semi-automated systems should be implemented which will be a better option than fully human operated workspace. Automated systems minimize the cost in manufacturing as well as increase productivity to assure more profitability.

Finally, the argument regarding automated system is the cause behind people losing jobs, the statement is not completely accurate. Automated system helps people not to focus on menial tasks but shift the focus towards more creative and meaningful tasks. Automated system far outweighs human workers in terms of productivity and profitability in the industries. From Islamic perspective, there is no definitive answer regarding automation in industries. But from the work of Nadarajan (2005) on Al – Jazari's book shows that the book was arguably most broad and analytical collection of the most ongoing knowledge about automated devices. The work outlined technological advancement of a range of devices and technique that both personified and expanded existing knowledge on automata and automation. This work proves that automation is nothing new in Islam. Few Islamic scholars agreed automation should replace human but must be in compliance with Shari'ah law. Therefore, automated systems are permitted in Islam.

References

Acemoglu, D., & Restrepo, P. (2018). *Artificial intelligence, automation and work* (No. w24196). National Bureau of Economic Research.

Bessen, J. E. (2018). Automation and Jobs: When Technology Boosts Employment. *SSRN Electronic Journal*. Retrieved from https://ssrn.com/abstract=2935003

Borkes, T. (2012). Electronic product assembly in high labor rate markets– a case study in exploiting the counterweight to low labor rate competition: Automation. In *The Jefferson Project presented on: The Pan Pacific Microelectronics Symposium, Big Island of Hawaii*, (2). Retrieved from http://www.thejeffersonproject.org/downloads/14BorkesPanPacPaperSubmittedFinalwpgReducedFileSize.pdf

Chui, M., Manyika, J., & Miremadi, M. (2015). Four fundamentals of workplace automation. *McKinsey Quarterly*, *29*(3), 1-9.

Grace, K., Salvatier, J., Dafoe, A., Zhang, B., & Evans, O. (2018). When will AI exceed human performance? Evidence from AI experts. *Journal of Artificial Intelligence Research*, (62), 729-754.

Li, D., Landström, A., Mattsson, S., & Karlsson, M. (2014, September). How changes in cognitive automation can affect operator performance and productivity. In *The sixth Swedish Production Symposium* (pp. 16-18).

Mohd Aiman Kamarul Bahrin, Mohd Fauzi Othman, Nor Hayati Nor Azli & Muhamad Farihin Talib (2016). Industry 4.0: A review on industrial automation and robotic. *Jurnal Teknologi*, *78*(6-13), 137 – 143.

Macpherson, J. D., de Wardt, J. P., Florence, F., Chapman, C., Zamora, M., Laing, M., &

Iversen, F. (2013). Drilling-systems automation: Current state, initiatives, and potential impact. *SPE drilling & completion*, *28*(04), 296-308.

Nadarajan, G. (2007). Islamic Automation: A Reading of al-Jazari's The Book of Knowledge of Ingenious Mechanical Devices (1206). *Media Art Histories*, (1206), 163–178.

Nimawat, D., & Shrivastava, A. (2016). Increasing Productivity through Automation. *European Journal of Advances in Engineering and Technology*, *3*(2), 45-47.

Piero, M. (2013). THE DRIVERS OF PRODUCTIVITY. *Annals of Faculty of Economics*, *1*(2), 253-262.

Rüßmann, M., Lorenz, M., Gerbert, P., Waldner, M., Justus, J., Engel, P., & Harnisch, M. (2015). Industry 4.0: The future of productivity and growth in manufacturing industries. *Boston Consulting*, *62*(4), 40–41. Retrieved from https://doi.org/10.1007/s12599-014-0334-4