

“A Study of Impact of Automation on Industry and Employees”

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Abstract:

Really an industrial automation is having positive or negative impact on industry and on employees is a big question. Without automation and technology, we can't imagine life at industry, today there is numerous changes are occurring in industrial sectors for the sake of improving productivity and efficiency in day to day activity. To withstand with globalization industry automation is very much essential on other hand machines or automation may replacing the human importance at their workplace. So, job insecurity, new task handling skill updating as per requirement of automation and technology changes in the industry sector this research article tries to focus on both the aspects of industry automation. Automation deals to make the process simpler, easier, and faster with low risk of life to be a boon on other side it may create anxiety, depression, and stress which may hazard the well-being and health, safety of employee at workplace so is it a curse for employee to get an idea about impact of automation, and how industry can maintain balance between used of human-machine combination for all such things this study is important.

Key Words: Industry, Automation, Positive Impact, Negative Impact, Employee.

Introduction:

Industry automation is one of the essential roles playing part of the manufacturing, operations, production, controlling processes; in every sector we cannot imagine a company without automation in today's scenario, life without multimedia and industry without automation are the things we cannot imagine. Although automation and robotics make the work easier, safer and faster but it is somehow affecting the human workforce and indirectly the social wellbeing of employees. Automation invented in 18's century grows in 19's and now they may replace human interventions in industrial process. And from that scenario we can predict the day that there will be no employees expect machines at work place. This is the most difficult task to manage importance of both human as well as machine at workplace. For instance, a cited report by Oxford economists' forecasts that up to 47% of total U.S. employment is at high risk of being highly replace by automation.

Automation in different sector is growing rapidly impacted employees as well as employer. Sometimes automation is boon for highly skilled and educated executive, supervisory employees because it may be helpful for them to complete the task within

deadline of management. It is also advantageous to workers at workplace for performing high risk task such as handling heavy, critical material, foundry and furnaces work, assembly work all such type of work can be performed by using automation robotics, different technologies and devices. Physical exertion and health safety of workers can be improvised by automation. Employer can avoid production rush, risk in hazardous areas like safety and accidental issues, wages on over time, employer can work more effectively and more efficiently for achieving the goal or objective and to withstand with today's global and competitive world. Productivity and yield improvement can be achieved by well-designed automation. (Scott technologies ltd, 2019).

Definition:**Automation: -**

The Oxfords English Dictionary (2006) defines automation as: "Automatic control of the manufacture of a product through a number of successive stages; the application of automatic control to any branch of industry or science; by extension, the use of electronic or mechanical devices to replace human labor."

According to encyclopedia Britannica automation define as "The application of machines to task once perform by human being or increasingly, to tasks that would otherwise be impossible. Although the term mechanization is often used to refer the simple replacement of human labor by machine, automation generally implies the integration of machine in to self-governing system."

Employees: -

Fair labor standards Act, defines an employee as "any individual who is employed by an employer." The Act further states that "employ includes to suffer or permit to work. The American heritage dictionary define employees as a person who works for another in return for financial or other compensation. (American Heritage Dictionary of the English Language, 1978).

The Black's law Dictionary stated that. Employee is as "A person in the service of another under any contract of hire, express of implied, oral or written, where the employer has the power or right to control and direct the employee in the material details of how the work is to be performed. (Henry Campbell Black)

Literature Review

Dauth, W., Findeisen, S., Südekum, J. & Wößner, N (2017) Impact of industrial automation on workers, they stated that due to the robotization in industry workers with lower skill and education have to survive for employment the job may get affected due to robotization in industry for manufacturing.

B. Rossi, *Man vs machine: productivity, creativity and job creation*, (2015) stated that, "The workforce of the future should need to focus on new ways to apply leverage skills so workers can add greater value. This workforce of the next generation could be defined by jobs that embrace and make sense of data and smart machines. It's all about changing perceptions of not only what is needed but what is most valuable for us to dedicate our lives too". He had stated that most important impact of automation is on workers mentality that lower down the self-esteem, feeling of useful anymore for handling new technology which may create stress on employees.

Carlos Hinojosa and Xavier Potau , *Advanced industrial robotics: Taking human-robot collaboration to the next level* (2017) in this paper the author discuss the replacement of human to human conflict by human to robot as robots are increasingly introduce in industry so workers must adopt the changes as human robot collaboration but the implications of robots taking the place of human workers, also known as 'botsourcing.'

President Kennedy declared that "automation... is replacing men", and also in the 80's there were fears that computers would result in job losses (Keynes, 1930; Economist, 2017).

Arntz, Gregory and Zierahn (2016) argue that in the OECD on average only 9% of the jobs is automatable .and every job required human monitoring. Automation affects employment directly as well as indirectly in terms of wages, salary and compensation mechanism etc.

S. Kiesler, and P. Hinds (2004), explored that even for monitoring the automation companies required human workforce in order to keep employees motivated on their job company can do job enrichment, job rotation etc.

Methodology:

This paper tries to highlight issues and impact of automation on various factors by descriptive research design using secondary data, which have been highlights by various researcher and practitioner. Various papers have been reviewed for research contribution on automation impact, research methodology used different sectors authors from various countries and year of publication.

Impact of Automation on Industry

Nikhil Kumar 2014 said that, Industry invest large amount of money in business automation whereas the adoption of business automation technology tool greatly influenced business operation, Human resource behavior, organization structure as well as their efficiency and effectiveness. There is a assertive impact of robotic automation on economic development. Increase in robotics investment by 1% is associated with a long - run gain in GDP per capita of 0.03%. (Ceber 2017). MCKinsey 2017a stated that, Yield improvement is a benefit of automation and magnitude of benefit varies significantly depend on individual used.

PwC 2018, illustrated that, New technologies are the creator of many new jobs, some are directly or indirectly related to it. Technologies and automation will result in the growth of productivity, incomes and wealth. Also, it arises labor demand and income expenditure. Some impacts of automation on different segments of industry are as follows

- Productivity
- Yield & Quality

Productivity & Profitability: -

Zierahn, Gregory & Arntz (2016), stated that production plays a vital role in increasing wages, overall employment, demand, affecting overall sector economy. Due to Robotics and automation productivity gains not only at company level but at both industry and national competitiveness.

Even after financial crisis in US manufacturing industries both production and productivity steadily risen with the growing robotic and automation (PwC 2016). According to (Graetz and Michaels 2015), there is a relation between productivity, Company competitiveness, increased demand for which automation and robotics plays a significant role. During the time period of 1993 & 2007, microeconomics research had carried out by using data from 17 countries of 14 industries, the study found that, Robot utilization in the industry for this country results average GDP growth rates by 0.37% points and productivity growth rate by 0.36% points. These numbers show that 12% of total GDP growth and 18% labor productivity growth for that 17 countries where robotization is used. Hence it is found that robot and automation have positive impact on productivity and GDP growth.

Yield & Quality: -

Automation and technological innovations and advancement leads to the improving long term increase in efficiency and productivity which leads to the improve yield and quality .Technological adoptions result in dropping of cost of transport and

communications ,logistics and global supply chain become more effective and faster all these will open new market and beneficial in economic growth .Industrial revolution also lead to yield great inequality due to net displacement of workers by machine (Schwab, 2015).

Due to digitization growth, low skilled and low job workers will be replaced by higher skilled and higher paid job which results in improving quality of life also it lead to social tension (Wolf,2015)

The fourth industrial revolution in manufacturing sector is having impact both positive as well as negative, it can raise income level by new innovative technological ideas, it will also helpful in improving quality of life by satisfying consumers demand by new innovative ideas implementation by using fourth industrial revaluation. It is quite easier task to improve quality and yield of industry and improve employee efficiency and performance around the world (Jee,2017).

Impact of Automation on Employees:

According to Mckinsey Global Institute it was found that, work activities and task due to the implementation of automation and advance technologies almost 46% of time spent on work activities due to the employees for completing particular task can be reduced. While on other hand it will affect employment, wages and salary of people in the labor market, as coin has two sides similarly automation impacted employees as well as employer in both the manner. Automation might contribute to work load on employees but it can be also helpful in reduction of physical exertion and repetitive task (Levert and Hery, 2018).

Job

Employment and wages are mostly affected by industrial robotics, the evidence for that U.S local labor market that were relatively exposed to industrial robotization resulting in great falls in employment and wages level between 1990 & 2007 (Acemoglu & Restrepo 2017). Where Berg et al. 2017 developed a model, which generates short run gains for skilled worker and capital owners but in long run, impoverished those who are unable to invest in labor and automation. Bessen (2016) has quoted in his research, automation leads to the job and task reallocation instead of job substitution in which robots are just a complement for a human, labor for performing routine, hazardous, dangerous task. Due to automation impact higher skilled employee gets a premium in the sector, while lower skilled labors get a new job in other sector. Finally, he proven in his research that automation doesn't cause net loss of job instead it results in substantial re-allocation of job from one sector to others. There is a positive co relation between Automation and job (Gregory and Arntz 2016).

David Autor (2015) quoted that, automation is a great substitute for higher labor demand. Human labor and automation combination are complementing to increase productivity and rising earnings of the industry.

Labor oriented, labor intensive and cognitively labor demanding task are quite eliminating and diminishing due to robotics and automation adaptive nature of industry for comparative advantages (Ford Martin 2015)

Health and Safety:

Construction industry have countless dangerous and clumsy environment everywhere which leads to poor and unsafe working condition at site. Also due to the workers fatigueness caused by physical exertion and human errors may lead to construction accidents. Hence in order to avoid health problems and safety issue various types of robots are developed (Li, R.Y.M 2015). Handling a heavy material with accuracy is difficult task and have ergonomic issue, so Sigma ergonomics suggested to design such ergonomic tool arm to move easily heavy material. The arm rely of spring tension to balance the tool weight for sanding, riveting, drilling etc. For example the EKso Bionics Zero G arm can hold the weight up to 19kg and balance, so it allows to operate accurately , freely and safely easy movement with load in any direction without Robots and automation are used on site for structural, maintenance work, window panel installation and under water construction work, which can do high hazardous work and save labor cost. Wearable robotics fastens reduce workers lower body stress which make them to work more efficiently and avoid accidents due to fatigue. (R.Y.M.Li and D.P.L.Ng.,2018)

Skill and technical knowledge

In a recent trend decrease in middle skilled, middle income jobs which integrate with wage inactiveness. Due to that chances of increased in inequality income. A Economist Maarten Goos, Alan Manning & Anna Salomons (2014), in his study of labor market polarization in selected OECD countries in 1993 & 2010 found decline in hours worked by middle skilled labor by 5-15% points. Automation results in increasing demand for higher skilled category as compared to lower skilled labor. However, the Category of Middle skilled, middle income covers a wide range of jobs & associated skills sets & although jobs in the category are diminishing overall. For example, middle skilled jobs in health care, mechanical maintenance and repair and some services is frequently growing as are skill needs within traditionally unskilled jobs. For that employer struggling to fill demand (Holzer 2015).

Economists Guy Michaels, Ashwini Natraj & John Van Reenen (2014), quoted that there is a positive correlation between growth in ICT (Information & communication technology) use & demand for high skilled labor.

Deloitte LLP (2015) stated that, many high skilled jobs order a wage premium, for instance in UK higher skilled jobs replaced by lower skilled ones by paying £10,000 more per annum, results in addition of £140 billion to the UK's economy

Positive Impact of Automation: -

Major two reasons for acquiring technology & Automations are increasing productivity and improving occupational safety by handling hazardous task at the workplace. Technology and automation are able to defend the technologically driven job loss, numerous growing inequalities in skill, education, income & investment capability. (Berg, A., Buffie 2016).

Technology mainly focus on change in task content perform by labor instead of job displacement, it tries to create new job for maintaining balance in labor market. (Vivarelli, Marco 2012).

According to International institute of substantial development automation not only provide employment but yield employees health & safety benefits. For example, in the mining industry it is accepted that automation provide safety benefit to labor working in the mining industry (2016).

International federation of Robotics 2017 quoted that due to Robotization in automotive industry in the U.S. 52000units of operational industrial robots were added in between 2010 and 2016, during the same period 2,60,600 jobs were added in the same sector. Similarly in German automotive industry, which is well known for its robot density (300 per 10,000workers) and 72313 jobs were added between 2010 & 2016 (date from EUROSTAT, 2018).

New technologies is a creator for many new jobs. Some are directly related while some are the result from increasing productivity, income, wealth, profit, yield demand which rises due to new technologies (PwC 2018).

Automation could increase productivity globally by 0.8 to 1.4% annually (McKinsey 2017a). Small increase in robot productivity can increase the output tremendously when robot and human are close substitute (Berg and Zanna 2018).

Negative Impact of automation: -

Worldwide in manufacturing and service sector automation replace routine task job content while on other hand it creates non-routine cognitive manual task jobs. (Michaels, G. 2014). By various study it is found that the most likely negative impact is on employment, lowering of wages, opportunities for low skilled worker. As technology eliminates and displace millions of jobs in manufacturing sectors and services (Rifkin, J. 1996).

An intermediate product is produced by machine and unskilled workers and the combined for final output with skilled labor. However, machine and unskilled workers are relatively convertible compared with intermediate product and skilled workers. An increase in machine productivity can replace the unskilled labor and reducing its wage. Finally result in improvement in machine productivity in turns creates effects for the things that occur at same period of time and future young that are remarkably bad for the chosen parameters. (Zeira, Joseph 1998).

A small innovation in machine technology (eg. Improved software) increases machine productivity which results in reduction in marginal productivity of low skilled workers while increasing the marginal productivity of high skilled labor.

It has effect on not only increase in the income gap between skilled and unskilled workers but also has a generational effect, increasing the income of older generation while lowering the income of young. this effect occurs because old have gather physical and human capital while young are endowed with unskilled labor. For employer generation distribution has a knock-on effect on national savings, workers, and increased investment in capital intensive technologies. (Kotlikoff, L.J and Sachs, J.D. 2012).

Technology and automation affect the labor by changing the job mix and skill demand. It should be noted that technological acquisition under Industry 4.0 in advanced industrial economies has been driven by cost benefit analysis of accessible technology and high skilled labor force. (Vashisht, P; and Dubey J.D. 2018). Skill gap across the labor force suggested that significant re-skilling and up-skilling require by acquisition of cyber physical system to meet the potential shortage in highly skilled professionals (Chandrasekhar C.P. 2008).

The potential displacement impact of automation and technology will increase global incidence of physical and mental health issues that are connected with unemployment and job anxiety. (Lafrance, Andrienne 2015).

Many companies won't be able to acquire automation through business as usual approach to skill development. Automation and technology require a shift in mindset. To manage a shifting labor market and technological landscape, companies will have to increase dexterity. For that companies have to commit continually reskilling their workforce, installing a lifelong learning mindset and digital skill development by using digital resources. These changes require not only by automation but also because of shifting labor demographic. (Accenture 2017).

Journalists and even expert stated that Automation does indeed replacement of labor. And extent of machine substitution for human labor and ignore the strong complementarities between automation and labor that increase productivity, gain earnings, and increase demand for labor.

Automation Forecasting Effects on Industry and employees: -

Since from 1998, it has reported by ICRIER on the manufacturing task content in the jobs of Indian industries has been rapidly automated. Which can create a big tension, pressure and built a stress on employees, resulting disturb individual wellbeing. With past decade, it was observed that routine and non- routine task which were mainly depends on dexterity is decreasing with the increase of analytical and cognitive task. "World Economic Forum 2016" predicted that, as many as 2 billion global jobs can be replaced by automation by 2030. It can be a curse for the employees which are lower paid, lower skilled & less educated. Automation impact is uneven on different sectors, different level employees as every sector and every automation, technology skill requirement is different for different task. Hence the impact can't be analyzed or predict by studying one sector or single kind of automation.

Thomas Frey (2012), stated that 2 billions jobs could be automated by 2030 worldwide. McKinsey (2017b) illustrated the jobs automated number should be 400million to 800 million.

Graetz & Michaels (2015) reported that, there is no link in between the use of robots and job loss for the studied countries in 1996 & 2012

Conclusion:

In this digital world we can't assume industry growth without digitization and automations. When the Technology and automation used with proper combination of Human skill and knowledge nothing will act as curse for employees and employer. In this revolutionary world automation can be used to improve quality, efficiency of worker, avoid hazardous and risky task, improve productivity and help to achieve goal of industry. Instead of blaming disadvantage one can improve skill, knowledge to grow with globalization and competitiveness. Automation has great impact on employee, employer and industry but it is depending on the perceptions of people how they react to it. Finally, automation is itself created, programmed, monitored and handled by human so automation can't substitute the human workforce completely but it just used to help manpower to improve efficiency of work and maintain work life balance between employee and industry to grow with market demand.

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