

# LET'S AUTOMATE THE WAREHOUSE

Warehouse automation techniques could take the productivity of a warehouse to the next level and simultaneously prove to be cost effective for any logistics company. Here, in this report, we try to explore which technology is given more thrust by leading logistics companies of India and overseas to achieve efficiency and cost-effectiveness.

- Gaurav Dubey

**U**ndoubtedly, every company in the world wants to tread on the path of increased productivity and profitability. Warehouses as a nerve center of supply chain play a major role in magnifying cost-effectiveness and productivity for logistics companies. A well-thought-out automation solution can be the key to unlock the benefits of warehouse automation for any company. Automating a warehouse or any other manufacturing facility demands whopping investment and extensive planning. But if done in a right direction two benefits would be inevitable – increased productivity and undefeatable edge over competitors. In the present scenario of ever growing competition, investment in innovative automations solution has emerged as a need of an hour for logistics companies.

It is challenging to deal with the operational growth and increased labor costs. It is hard to keep costs down while improving operational efficiencies. Well-planned automation solutions can have a big impact on the warehouse operations. Generally, repetitive tasks consume large amount of time and it also increases probability of commitment of errors in the process. Several activities in warehouses are of repetitive in nature. For eg - One walks to a bin, pick a thing out of a bin, and put that thing in a new location over and over. Shipments are entered into tracking systems over and over. One sort, categorise, and store items over and over. These activities could be automated by existing automation technologies in order to decrease probability of errors.

Robotics automation could play a significant role in achieving greater warehouse productivity and savings on salary of employing workers in a warehouse is an added benefit to it. On the other hand,





WMS, albeit simple nomenclature, has made many warehouse activities faster for people to perform and generate efficiencies to reduce labour-intensiveness. WMS systems can now be integrated with either e-commerce OMS and WMS, leading to more efficient warehouse operations in terms of both people management, product placement/picking accuracy and leading to lesser liabilities.”

**VIKRAM PAUL**, Regional Managing Director, Cargo Partner Logistics India Pvt Ltd

facility managers could find out inefficiencies through Warehouse Management Software and address them. The software can easily track and calculate time an average warehouse operator takes to complete a task. Once inefficiencies and pain points of warehouse operations are identified, steps could be taken for eliminating them by deploying automated material handling and management systems.

Unarguably, land is a critical asset to any company. So, usage of every inch

Warehouse automation could increase throughput and the labour productivity, decrease damage in product handling, increase accuracy of orders, eliminate dormancy and errors with manual data processing, replace need of workers for repetitive tasks and other added advantages could be innumerable.

As mentioned above warehouse automation techniques could take the productivity to the next level by simultaneously proving cost effective for a logistics company. We tried to explore

### **ACCURATE INVENTORY MANAGEMENT AT ALL LEVELS IS THE KEY**

Warehouse management systems have advanced considerably in the last couple of decades and it's the first choice of Vikram Paul, Regional Managing Director, Cargo Partner for achieving better efficiency.

He says, “WMS, albeit simple nomenclature, has made many warehouse activities faster for people to perform and generated efficiencies to reduce labour-intensiveness. WMS systems can now



*Once inefficiencies and pain points of warehouse operations are identified, steps could be taken for eliminating them by deploying automated material handling and management systems*

of the available space of the production floor of a warehouse is vital for increasing productivity. Warehouse management software enables a warehouse manager to make the most of available space. This provides information to the manager about assigning of lesser used inventory to higher shelves and keeping frequently used items near the shipping area. This activity can maximise the utility of warehouse shelves.

on which technology leading logistics companies of India and overseas put the thrust most to achieve efficiency. Among the available technologies such as Warehouse Management System and Warehouse Control System which technology provides better cost optimisation. And also tried to figure out the workability of Cobots, collaborative robots that are designed to work alongside human workers, in India.

be integrated with either e-commerce OMS and WMS, leading to more efficient warehouse operations in terms of both people management, product placement/picking accuracy and leading to lesser liabilities. At the end of the day, lowest liabilities matter as you handle very high-level inventory. Efficiency is directly proportional to the cost and accuracy, when it comes to managing complex supply chains.”



As a Logistic Service Provider, we need to keep in mind that our customers are expecting efficiency along with flexibility, so each time we consider investments in automation we need to check not only their added value for our customer but also their versatility to be adapted for activities of our customers.”

**PATRICK BELLART**, Technological Innovation and Automation Director, FM Logistic

*Paperwork and data entry: WMS has reduced the need for people to spend time completing paper forms or entering data from documents into spreadsheets and other data-management applications.*

*Picking efficiency: Warehouse operators can pick faster with WMS, because the technology helps to organise warehouses more efficiently and (with features such as system-guided picking) enable more efficient working practices to be followed.*

*Task Interleaving: As WMS solutions have become more powerful, they have extended the concept of system-guidance across all activities, especially those performed by forklift operators and have managed to cross integrate with hardware assets to do complex tasks.*

An excellent warehouse management system can help reduce costs by automating cycle counting and maintaining location control. The layout of your warehouse can save you costs. A velocity layout, systematic location mapping, or having top demand SKUs near shipping, will reduce the cost of picking and put away. You can now drive cost efficacy through scanning eliminating inaccuracy.

Paul maintains, “Amongst the various technologies available to us, we will use a Warehouse Execution System (WES) combining WMS and a Warehouse Control System (WCS). Regulating automating, and optimising manual pro-

cesses can reduce staff requirements, centralising production operations to lower-cost areas and create a more proactive approach to ensuring customer satisfaction. With an automated, cost-effective transportation and integrated logistics one can implement major strategic changes to provide visibility, reduce costs and increase customer service levels. The best supply chain cost reduction tip is to efficiently collaborate and partner with suppliers to help reduce costs. Suppliers can sometimes absorb direct logistics costs that have to be derived by integrated solutions with various suppliers leading to the warehouse consolidation.

“Integration of the systems that allows us to reduce returns, Return Merchandise Authorisations (RMAs), Return to Vendor (RTV) or Reverse Logistics systems can aid in logistics cost reduction. Space management by removing obso-

is increased storage density in racks by improving vertical space utilisation, bib re-profiling, trucking optimisation, reduction of stock damage by eliminating movement in transit, better usage of floor space and organised operations that links directly to lab out, efficiency, asset utilisation and inventory accuracy.” Paul concludes by making the point that accurate inventory management at all levels is the key here.

### INVESTMENT IN AUTOMATION SHOULD ADD VALUE TO CUSTOMERS

There is a popular adage in the business world - ‘Customer is a king’, conforming to the same thought, Patrick Bellart, Technological Innovation and Automation Director, FM Logistic points out, “As a Logistic Service Provider, we need to keep in mind that our customers are expecting efficiency along with flexibility, so each time we consider



lete inventory and a transport management system will optimise stock to utilise the most effective lanes and routes. The end result of the above integration

investments in automation we need to check not only their added value for our customer but also their versatility to be adapted for activities of our customers.”



“AS/RS has not yielded desired results in India due to lower cost of manpower and space as compared to western countries. WMS as system-based automation and physical environment automation are the popular warehousing automation systems in India.”

**ADITYA VERMA**, Managing Director, Contract Logistics Pvt Ltd

This assumption makes FM focussing particularly on robotics solution: Automated Guided Vehicles for pallets load, Goods to person robots, moving shelves with products to picking operator, even new solutions using robots for vertical storage are available today. The company also consider cobotic arms or cobot for our copacking activities (late differentiation or promotional packaging for our customers). Such solutions offer efficiency and are relatively simple to install with low infrastructure requirements, they are scalable, redundant, in one word flexible.

“Nevertheless, they are not the universal solution for every need so that in some case we consider traditional - conveyors bases - automation as it could be a better solution to reach expected speed or for some process or kind of products. And often the final solution is a combination of both traditional automation, robotics solution and manual process: market offerings are becoming wider but, in most cases, new solutions are rather increasing number of possible options than really replacing older solutions.” Bellart maintains that in FM Logistic we deliver right solution as per the needs of our customers.

Like every other Logistics giant, Warehouse Management System (WMS) is the first choice of FM Logistic among the available IT systems. The company manages 99 per cent of its operations with WMS and considers it as a key for cost optimisation. Bellart says, choice of proper WMS and good knowledge of how to set it up is the key to success. “It is the core of warehouse management,

defining which product is where and what mission has to be executed from product reception to order loadings. Only very simple operations can be operated without WMS.”

Warehouse Execution System (WES) completes WMS to support resources management, most often it manages scheduling and missioning. Usually, WMS integrates a WES module. Bellart continues, “For FM Logistic, optimisation of resources is our core business: we are a service company, our customers pay first for the time of people per operations and resources used, so our duty is to deliver them best optimisation of these resources.



“We are using WES integrated with WMS and if we observe that delivered solutions are not sufficient to get expected excellence then our IT team develops specific WES for performance tracking. Currently, we are deploying

a new solution called ‘Cockpit’ for all our team leaders, in order to have a real-time view of activity status on the table, performance of operations versus target and to receive alerts in case of deviation. We believe that excellence is not being gained in offices but on the work floor close to the operations.”

### **WAREHOUSE MANAGEMENT SYSTEM - A FIRST STEP TOWARDS AUTOMATING WAREHOUSE**

When asked about the best warehouse automation technology, Aditya Verma, Managing Director, Contract Logistics Pvt Ltd said, “Let me begin with pre-automation steps which would involve process mapping and understand-

ing of exceptions and ways to handle it. A detailed process map along with time motion study would provide required pointers for automation. Picking and put-away is generally the very first need of any warehouse in India.



Cost optimisation may not be achieved through a single technology, but a hierarchy of technologies connected through a multi-tier architecture could optimise the cost in a better way.”

**RISHIN MATHEW, DGM – Centre of Excellence, Future Supply Chain Solutions Ltd**

“Therefore, I would recommend Warehouse Management System (WMS) as first step of automation that would be followed by implementing methods of complete product movement inclusive of - storage area to docks – pallet flow systems, conveyor belts and guided vehicles. Finally, a Warehouse Control System (WCS) is to be put in place to manage all instructions.”

“WMS coupled with ‘pick to light’ or handheld based picking would basically the first step for any size of warehouse to expect benefits – both in terms of manpower cost reduction and minimizing picking errors. However, as size of warehouse gets larger, Automatic Storage/ Retrieval System (AS/RS) coupled with WCS would yield better results in handling very high-volume systems such as Cargo handling at Airport.”

Verma holds the view that AS/RS has not yielded desired results in India due to lower cost of manpower and space compared to western countries. WMS as system-based automation and physical environment automation (that includes automatic sorting, strapping, shrink wrapping, conveyors, automatic weighment, in-motion cubing etc.) are the popular warehousing automation systems in India. Also due to limited subscription of WCS/WES, cost of implantation is still very high, making these systems less viable.

### **AUTOMATIONS ENABLE EFFICIENCY IN OPERATIONS**

There are various automation and technology options available for improving the efficiency of all warehouse

processes namely receiving, put-away, picking, sorting, shipping, inventory management etc. OTIF (On time delivery in full) is the most important key performance indicator for supply chain efficiency, thus it is imperative to prioritise automation of picking and sorting operations as they consume maximum resources in terms of labour and space in a warehouse.

Rishin Mathew, DGM – Centre of Excellence, Future Supply Chain Solutions Ltd says, “Picking efficiency can be improved by using voice and vision-based technologies along with goods to picker systems like AS/RS, while sorting can be automated using Put to Light and Sortation systems. Our company has installed Put to Light systems in various distribution centers which handle fashion, general merchandise and food categories. A high-speed cross belt unit sorter and case sorter have been commissioned in our Mother DC in Mihaan with sorting capacity of a million units per day.”

Along with significant increase in throughput from the existing footprint, warehouse automation has also enabled higher accuracy in operations. The company has already trialed voice picking and are planning to roll it out

in multiple warehouses in the coming months. On the point of cost optimisation, Mathew suggests that it may not be achieved through a single technology, but a hierarchy of technologies connected through a multi-tier architecture could optimise the cost in a better way.

Mathew continues, “While a warehouse management system (WMS) helps in planning, executing and controlling the warehouse operations, the warehouse



control system (WCS) coordinates the operations of the automated material handling equipment like conveyor and sortation systems. We are currently using both systems to manage operations in our automated warehouses.

“Warehouse Execution System (WES) is a more evolved technology that encompasses both warehouse management and control system functionalities coupled with business intelligence enabling predictive as well as prescriptive analysis. Thus, WES offers the best



India is moving towards developing new state of the art automated warehouse management storage and solutions. Escalating cost is a major drawback as the market (International/Domestic) is not geared up to shell out extra for automation. However, we are sure that in upcoming times with various government initiatives, much more automated warehouses will come up in the scene.”

**KRUTI JOBANPUTRA, Director, JWC Logistics Park Pvt Ltd**

dynamic optimisation of labour, equipment and associated cost on a real time basis,” concludes Mathew.

### GOVERNMENT INITIATIVES FAVOURING WAREHOUSING

Automation, is a very big word which was always used for Automobile or

pharmaceutical customers. Today, India is moving towards developing new state of the art automated warehouse management storage and solutions. Escalating cost is a major drawback as the Market (International/Domestic) is not geared up to shell out extra for automation. However, we are sure that

tential of warehousing in India as yet and hence strictly in today’s context it’s the WMS system that is most relevant”

### AUTOMATION IS THE DEAL TO CLINCH FOR LONG TERM PROJECTS

Decision on automation and technology needs to be driven by fundamental parameters of process maturity, volume to be handled, tenure of deployment and ROI desired. Vikram Mansukhani, Head 3PL Division, TVS Logistics Services Ltd – India, points out, “A further decision on customised technology versus off the rack technology also needs to be made keeping in mind the fundamental parameters as well as the urgency of requirement to deploy. One size definitely does not fit all and the wrong choice of technology/automation could well make a manual process that is working well, go over the hill, especially given that such decisions and deployments cannot happen at frequent intervals.”



**Robotics automation could play a significant role in achieving greater warehouse productivity and savings on the salary of employing workers in a warehouse is an added benefit to it**

Electronic Industry. But with the IT Industry taking interest in the logistics sector, it is changing every single day. Kruti Jobanputra, Director, JWC Logistics Park Pvt Ltd says, “We at our cold storage facility have set up a completely automated unit for customised VAS (Value added services) for our

in upcoming times with various government initiatives, much more automated warehouses will come up in the scene.”

### WAREHOUSE MANAGEMENT SYSTEM LEADS THE WAY

Vikas Yadav, Director, Future Warehouse Solutions Pvt Ltd strongly favours Automatic Storage/ Automatic Retrieval system when it comes for warehouse automation and says, “To my mind the single most important technology that has impact across all warehouse storage categories would be automatic retrieval system. As far as available technologies are concerned I reckon we haven’t reached the full po-

On the question of cost optimisation, Mansukhani says, “Each of the technology platforms lend themselves to different process maturity, affordability and volume to be handled. The four systems mentioned here are not alternatives but rather can all be used together depending on the size, scale and complexity of the operation to be executed. It is also important while deploying technology, to clearly understand some of the other challenges in terms of availability of skilled manpower in a particular geography and at the right cost. If the job is routine in nature and highly voluminous, then automation is the best way



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to go for a long-term project exceeding a period of seven years.”

Implementation of automation also depends on Economies of Scale. Currently in India, the Return on Investment on automation is not visible due to smaller warehouses and non - standard scales. Automation will be viable and the ROI will be visible when there are larger warehouses and unitisation, palletisation and standardisation of cargo.

Vivek Arya, Managing Director, Rhenus India, says, “There are various types of automations which can be implemented in a warehouse. Automation could be software integration such as WMS or ERP (with excellent WMS module); automation could also be in terms of physical material handling such as AS/RS system. The implementation process, however, goes hand in hand for system automation and physical automation. The level of automation needed, is directly related to complexity of products and supply chain needs to be handled. Warehousing of high SKU count and fast moving small products is most difficult to manage manually as it can lead to various human errors related to multiple handling. On the other side, warehousing of low count SKU and slow-moving products are less prone to human error. Physical automation required is product of throughput rate required and cost associated with throughput. Physical AS/RS systems are required only when high throughput rate is required throughout the year. To conclude, automation is specific to the expectation of supply chain at the warehouse location.”



***Automating a warehouse or any other manufacturing facility demands whopping investment and extensive planning. But if done in a right direction two benefits would be inevitable – increased productivity and undefeatable edge over competitors***

#### **COBOTS – AN INNOVATIVE APPROACH TOWARDS AUTOMATION**

If warehouses are made fully automated then it would curtail the requirement of humans inside the warehouses to a large extent. It could further worsen the problem of unemployment. In the country like India where unemployment is a

big issue, and it tops the agenda of any government which is voted to power, the concept of Cobots – collaborative robots that are designed to work alongside human workers – could be a possible mid-way between automation and employability of people. We tried to ascertain the viewpoints of the leaders of the logistics industry on the concept of Cobots and here are their responses –

#### **SCM IS A HUMAN SUPPLY CHAIN ABLY ASSISTED BY DEVICES**

In the future, as in some cases even right now, warehouses will be fully automated, possibly eliminating the need of humans working inside warehouses. Vikram Paul from Cargo Partner puts up a point to ruminate and says, “Humans are always a point of initiation of any action and decision, that's why at Cargo Partner, in the true sense we consider our people as our biggest asset. We will always need the people to work in tandem with the robots and have a more collaborative approach. Mid way to the whole scenario is a partly automated warehouse, in line with the customer process and thoughts, manned by fewer human interaction. A collaborative approach will always be prudent in these scenarios to ensure that there is a more of a progressive and human touch to the processes inside the warehouse. Like they say A SCM is a human supply chain, ably assisted by the devices to make sure that it is managed well.

“COBOTS have to be programmed by humans in the end. COBOTS are not just agile enough to keep pace with the growing demand for customised prod-



While deploying technology it's important to clearly understand some of the other challenges in terms of availability of skilled manpower in a particular geography and at the right cost. If the job is routine in nature and highly voluminous, then automation is the best way to go for a long-term project exceeding a period of seven years."

**VIKRAM MANSUKHANI**, Head 3PL Division, TVS Logistics Services Ltd – India

ucts while humans can “reprogram” ourselves in a fraction of a second. When we have cooperation between people and machines, for eg. a person guiding a part-automatic robot, we're much more flexible and can produce many more products on one production line. The variety is too much to take on for the machines.” Paul signs off.

### FULLY AUTOMATED WAREHOUSES ARE STILL A FUTURE BET

Patrick Bellart from FM Logistic feels that fully automated warehouse is a pure concept, not a reality, even today in most automated warehouse, humans are still involved in some operations such as loading/unloading, un-foiling etc because robots are not able to per-

form these operations efficiently. And humans also supervise robots, usually, you need one human for three to five picking/gripping robots because robots cannot face with all small random cases which pops up in the picking process.

He backs his thinking with some examples and says, “Fully automated warehouse is still a bet for future as they deliver long-term payback (over 10 years) and if your operations will change they will not fit it. For example - delivering a hypermarket is not the same as delivering a convenience store, not speaking about e-commerce orders. Full Automated solutions will be able to manage only the flows they are designed for. Industry 4.0 or Logistics 4.0 is looking to

introduce automation in processes by keeping flexibility in operations.”

‘Lighter automation’ with a right balance between men and machines is a solution to go for.

Machines are good for repetitive tasks and heavy load whereas men are good for versatile tasks where adaptation is required.

“From this point of view cobots (collaborative robots which are aware of their environment so that they can work in open environment without fences around) are a very interesting solution.

At FM, we have 15 Universal arms we



**A SCM is a human supply chain, ably assisted by the devices to make sure that it is managed well**



“Humans and cobots working together as teams have shown to be significantly more productive than teams that consisted of robots or humans alone. In the long run, humans must continue to rely on the inherent benefits of cobots and further develop the abilities of robotic systems at the same time.”

**VENKATESH RAO**, President, Transped Logistics Pvt Ltd

integrated with our own teams (designing grippers printed with 3D printers) and 40 autonomous forklifts. It is a beginning, we intend to deploy them at a larger scale as they produce greater degree of efficiency and flexibility. Another example is of drones, we are putting in production our four first drones for inventory check, so that tomorrow stock counting will not be a painful operation, with lifts and three days to 1 week shut down of a warehouse but a continuous check done automatically by collaborative drones.” Bellart concludes by pointing out the limits of these new solutions which are weight capacity and high costs, but this is changing very quickly so we clearly believe it is the future of Logistics.

### **HUMANS WOULD NEVER LOSE THE EDGE IN LOGISTICS AND WAREHOUSING**

“In an unpredictable environment like logistics and warehousing, humans would never lose the edge”, Aditya Verma from Contract Logistics vociferously puts his point forward. He continues, “As seen during recent technological development, robots and robotic systems are taking control of repeated tasks much faster than we would have imagined, especially in manufacturing environment. The day may not very far where we find warehouses completely controlled by robots. Hence, the ‘Cobots’ concept would seem to be happening much earlier than complete automation. Humans would be working along with robots or using collaborative robotic tools to obtain the best productivity and quality in warehouse,” concludes Verma.



### **SUPPORTING WORKFORCE WITH COBOTS IS THE RIGHT APPROACH**

Today, developments in robotics for logistics sector is advancing rapidly in multiple areas like order picking, sorting, packaging, trailer loading and unloading, inventory verification etc. Robotic warehouses would be highly scalable, reliable, flexible and easier to relocate than the conventional distribution centers. Mobile cobots equipped with sensors, vision technology and controlled through artificial intelligence and advanced warehouse control systems can safely work alongside humans to pick, place, move, stack and pack wide variety of goods in the warehouse with higher efficiency and accuracy.

“I think the right approach would be to supplement and support the workforce with collaborative robots, thus allowing people to manage the complex tasks and handle exceptions while delegating the repetitive and laborious tasks to robots for improving the overall productivity of warehouse,” Rishin Mathew from Future Supply Chain says.

### **GIVE RISKY AND REPETITIVE TASKS TO COBOTS**

Vikram Mansukhani from TVS Logistics Services Ltd – India agrees to the point that automation would definitely curtail the requirement of humans inside the warehouses. He suggests that the possible midway could be the best combination of humans and Cobots



According to OECD studies, only nine per cent of today's jobs can be fully automated. Hence, requirement of humans inside warehouse will not be eliminated."

**VIVEK ARYA**, Managing Director, Rhenus Logistics India Pvt Ltd

working together would be for the humans to be in charge of planning and control while the Cobots take over the repetitive, risky (chemicals, abrasives, heavies) and quality control tasks.

### INDIAN ECO-SYSTEM IS ENTIRELY DIFFERENT

Agreeing with Mansukhani, Vikas Yadav from Future Warehouse Solutions Pvt Ltd says, "The international case studies do suggest that the trend is curtailing down humans in warehouses, and with more SKU's and more complex racking systems, the displacement of humans with concept like cobots is inevitable. However, I believe that the Indian working eco system is different from the international one, as we have highly skilled and cheap manpower available at our disposal."

### ROBOTS CAN'T REPLACE HUMANS

Robots are not replacement of humans, Venkatesh Rao, President, Transpeed Logistics Pvt Ltd is a firm believer of this thought. He says, "I reckon robots could not replace humans completely

as there are many tasks that are beyond the capabilities of robots, such as – creative decisions, judgments, ability to improvise, and other actions that require fine dexterity.

**Warehouse automation techniques could take the productivity to the next level by simultaneously proving cost-effective for logistics companies**

The concept of Cobots – collaborative robots are the way forward. Cobots are designed to work alongside humans not to replace humans in warehouses. These robots make the human's jobs easier, faster and perform repetitive tasks that affect the health and safety conditions. Collaboration of humans and robots reduce time, cost and floor space as well. Humans and cobots working together as teams have shown to be significantly more productive than teams that consisted of robots or humans alone. In the

long run, humans must continue to rely on the inherent benefits of cobots and further develop the abilities of robotic systems at the same time."

Vivek Arya from Rhenus India also feels that automation is not a big threat to employability of people and sites facts from OECD studies in his response and says, "Increase in automation will lead to curtailment of some job profiles but it will open doors to new opportunities as well. According to OECD studies, only nine per cent of today's jobs can be fully automated. Hence, requirement of humans inside warehouse will not be eliminated. Cobots are now widely used in manufacturing sectors. Cobots cause reduction in accidents and allow operators to focus on less arduous tasks in which human intervention is essential. Cobots can perform various roles across various industries. They can work alongside humans in any work environment. In warehouse they can be used for packing, labelling and other value-added activities where high accuracy is crucial."

### LET'S CONCLUDE -

Hence, automation is going to be the next big disruption in the warehousing sector. Use of robots, drones and technologies like RFIDs, barcodes, conveyers and automated picking solutions etc would be used more and more in the warehouses of future. Implementation of technology will definitely have some impact on the employment but smart logistics companies have started taking initiatives to impart more skills to employees so that automation doesn't affect employment negatively. 

