

SUPPLY CHAIN AUTOMATION: KEY STAGE IN SUPPLY CHAIN THAT CAN BENEFIT

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Abstract

Supply chain automation can bring a plethora of benefits to business and supply chain management withal. Whether you work as a transportation management solutions expert, a professional driver or a supply chain specialist, automation can make your life easier in many aspects. This research depicts a rising trend in supply chain by minimizing manual labor and the distribution costs by proposing a change in its production line also by reducing the raw materials purchase costs. This will make the company more adaptive as it will gain responsibility of its own raw materials supplies and its distribution chains and increase production by automation. It is vital for the company's survival as it gains greater control over their supply chain there by adapting their production according to market demand.

1. Introduction

In essence, supply chain automation means utilizing technology to centrally manage a complex web of working parts. The goal in supply chain automation is to systematize part or all of a workflow in order to improve processes. Automating part or all of the supply chain has a number of benefits that can potentially reduce operating costs and increase revenue. We trace various developments in the area of supply-chain automation and discuss the history of automation from the viewpoints of material-flow, information-flow, supervision and control, and relationship automation and identify future directions. The main message is that it is important to make balanced investments in all four facets of automation: material-flow, information-flow, supervision and control, and relationship automation to maximize shareholder value. to maximize shareholder value. Just in time to enhance 21st-century industry, material-flow, information-flow, supervision and control, and relationship automation are reaching maturity. Countries all over the world are feeling the increased pressure of a global consumer base, trade deals gone awry and increased competition in their verticals. In the ongoing struggle to shed costs wherever they can be shed, supply chain automation has emerged as a popular way to do just that.

By streamlining routine tasks and empowering the human elements of the supply chain to focus on bigger-picture items and longer-term planning, automation can help companies of all sizes:

- Lower their operating costs
- Increase their accuracy and productivity
- Reduce or greatly reduce worker injuries
- Arrive at more accurate and timely enterprise decisions

2. Literature Review

There have been similar researches on supply chain automation where there is subsequent proof of production costs being reduced. For example, a Massachusetts-based company employs a different method that has radically increased its productivity. Instead of warehousing robots, a system of conveyors carries all products that need to be palletized above the warehouse floor to their final destination to be shipped. Supply chain automation gives them the option to employ smart technology that can identify the number of products that need to be shipped and move them almost 75% of the way through their journey. Even simpler solutions make use of no hardware at all, simply optimizing the pick, pack and ship route so your workers don't take inefficient paths through the warehouse. Outside of picking and packing, supply chain automation serves the customer in other ways, too. When an order is received, it automatically triggers the fulfillment process, while providing the customer with constant information on where their package is, when it should arrive and any other information they may need. But throughout this research report the overall control of the supply chain from the Material Supplier to the distributor will be a major part as it will demonstrate the capacity in which the product can cope with the market not just in increasing production but adjusting along the way.

Problem Statement:

- i. Mass production usually access more time than the average target. Production quantity remains massive as yearly metering. Company needs extra manpower for maximum production within minimum time, for this reason, labor cost is also increasing day by day.
- ii. Large manufacturing plants face difficulties in the market by not having proper oversight of their vast supply chain. This commonly causes over production where they may be forced to decreased their product value or may cause them to fail to keep up with the demands of the retailers.
- iii. Overall costs are also an entity that lacks the company to invest and grow in other areas and limitations of working days and mandatory recesses makes them lag behind of their full potential.

Research Questions:

RQ1: To understand SCA and its dimensions.

RQ2: To delineate SCA from other related areas in SCM.

RQ3: To identify various contributions in the field and outcomes with the optimization process.

RQ4: To find solutions for various problems with beneficial properties.

3. Research Methodology

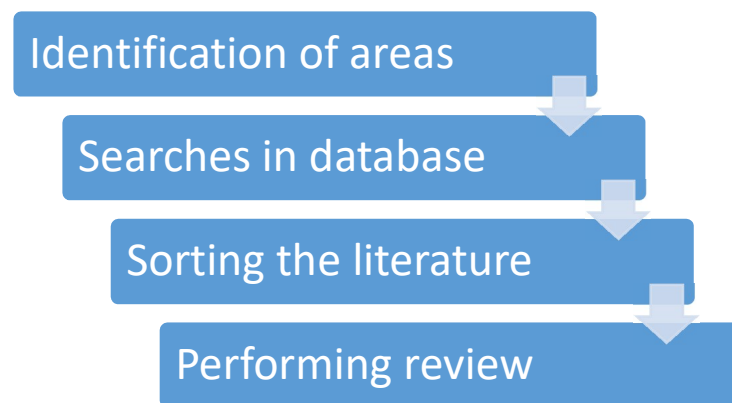
In order to answer the research questions, the literature review method is used. Our research paper tries to identify the trends in automation of SCM. There are various definitions and theories of SCA which have changed rapidly with time. We have reviewed a lot of research papers and have made an attempt to study the various definitions of SCA. Various research papers from databases were identified and referred to supply chain automation.

The following methodology for the literature review process has been adopted-

- i. Identification of Areas:** Based on the research questions, we were able to identify the particular areas in which we were supposed to find literature.
- ii. Searches in Various Databases:** After finalizing the areas for literature review, we utilized various databases to find the relevant research papers.
- iii. Sorting the Literature for Review:** Once the research papers were available, the papers based on the relevance of those papers with respect to the research questions were sorted out.
- iv. Performing Review:** The sorted papers were then reviewed in an attempt to answer the research questions.

This research introduces key supply chain automation tools and methods. The aim is not to cover them extensively, but to give enough background to position the research in relation to the automation infrastructure development. Development of automations has created new tools and methods that are driving the recent interest in these concepts.

Visual Representation of the Process:



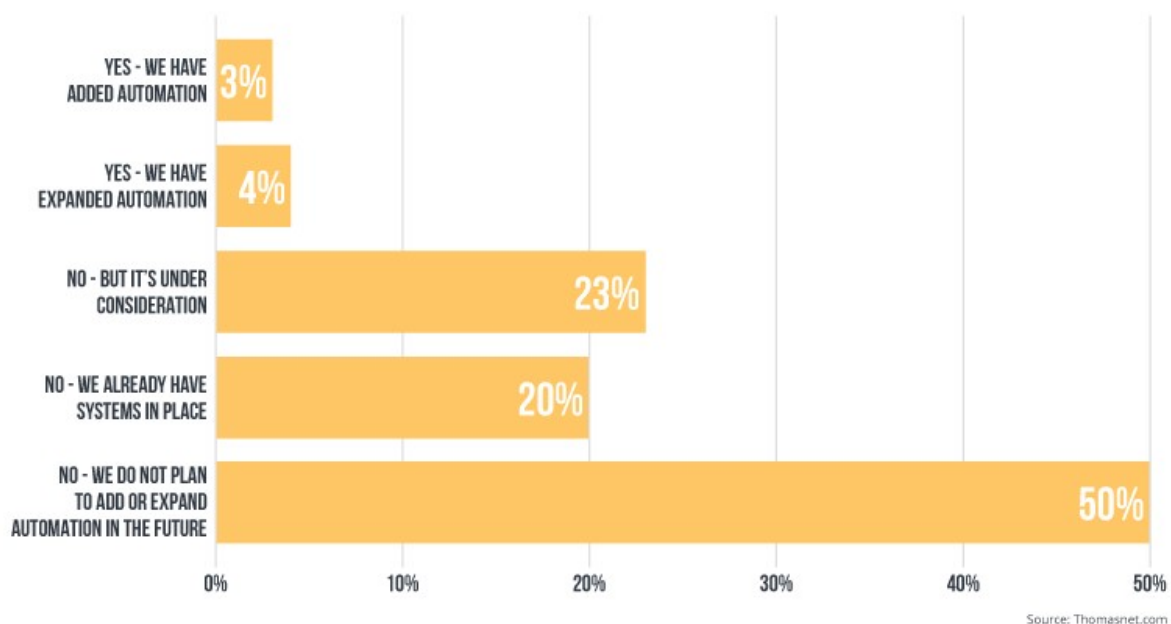
4. Findings

By proceeding with a view to methodology, we trace various developments in the area of supply chain automation in supply chain management. We have found a good result in this research. Automation is simply a piece of the “operational excellence” puzzle that so many organizations and supply chains strive for today. With automation, the supply chain is streamlined from end-to-end, enabling all different phases and pieces of the supply chain to be managed in tandem. Automating part or all of the supply chain has a number of benefits that can potentially reduce operating costs and increase revenue. The next evolution of the digital supply chain is coming fast. We all knew automation was here to stay, but we can expect to see it proliferate since the pandemic has altered supply chains across the globe.

The World Trade Organization expects international merchandise trade will decline by between 13% and 32% during 2020. With supply and demand changing so quickly and unpredictably, manufacturers with the most agility in their processes will be the ones most able to adapt. That is the driving force behind the increased interest in automation.

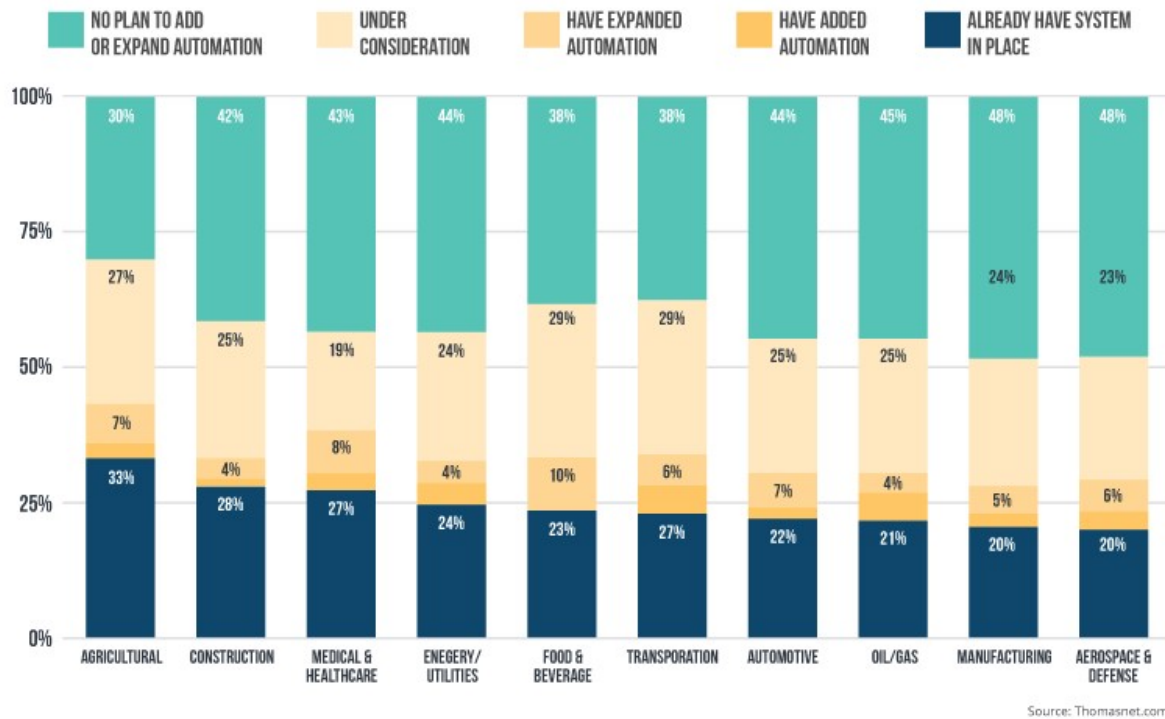
Automation as a Covid-19 response:

Last month’s *Thomas Industrial Survey* examining COVID-19’s impact on the industrial sector revealed that one out of four U.S. manufacturers is considering expanding industrial automation as a result of COVID-19, while one out of five already has automated systems in place.



Automation in agriculture, food & beverage and transportation sectors:

The study also showed that industries most interested in automation are in agriculture and construction, followed closely by the food & beverage and transportation sectors.



Benefits of Supply Chain Automation:

The global supply chain is constantly growing and changing. Organizations are utilizing and should be utilizing the power of technology to help streamline operations for a more efficient, cost-saving process. Below, we'll look at some of the major benefits that organizations can reap by choosing to automate their supply chain processes.

1. Decrease operating costs

1. Supply chain automation helps in the reduction of labor costs, inventory, warehousing, and overhead costs associated with inventory storage, including rent, labor, and energy costs. By maximizing production, labor costs and overhead costs are reduced.

2. Increase productivity

1. Optimizing the current resources with automation in the supply chain can enable “around the clock” work, allowing companies to gain more productivity. Companies can gain up to 20 percent more productivity in areas that have been automated.

3. Increase volume

1. For manufacturers, automation can increase the volume of product that can be produced. Automated technology combines the skills of trained workers with the accuracy of automated equipment, in turn increasing productivity.

4. Improve accuracy

1. Automation can reduce errors associated with manual processes such as data input, as well as help plan cost control by providing accurate, real-time information on inventory levels.

5. Enhance time savings

1. Through streamlining business processes, supply chain automation boosts time savings by reducing the time associated with implementing labor intensive tasks such as accounting, which saves manufacturers time and money.

6. Refine compliance

1. Automation can improve organization’s compliance with industry standards as it can standardize operations for employees and vendors, schedule routine asset maintenance, and track and trace the flow of products for full warehouse visibility.

7. Advance data accuracy

1. Automation can reduce errors associated with manual data entry and can also provide real-time visibility into warehouse management systems. In addition, paperwork can be eliminated, allowing organizations to make informed decisions about inventory, assets, and workforce with accurate and readily available data.

Here is where automation steps in. Time-wasting processes can fall into automated workflows, and human employees can spend more time forecasting, analyzing trend data and developing relationships with clients. With so many benefits to adopting automation, it may come as a surprise that a recent study shows that nearly 63% of companies do not use technology to monitor their supply chain performance.

5. Discussion, Future Research Direction & Limitations

Supply chain automation is being adopted by more and more operations as the complexity of operating in today's market continues to rise. Supply chain managers are constantly looking for ways to improve the efficiency and accuracy of their supply chains. Supply chain automation can put systems into place that immediately react to adverse conditions. If there is a problem at a manufacturing plant, an automated system could instantly place orders for integral equipment or parts from another partner without having to run the request up the normal chain of command. Suddenly, your supply chain is saving you hundreds of thousands of dollars when those critical parts (*that your system's already ordered*) jump in price after word of the slow-down reaches the rest of the world.

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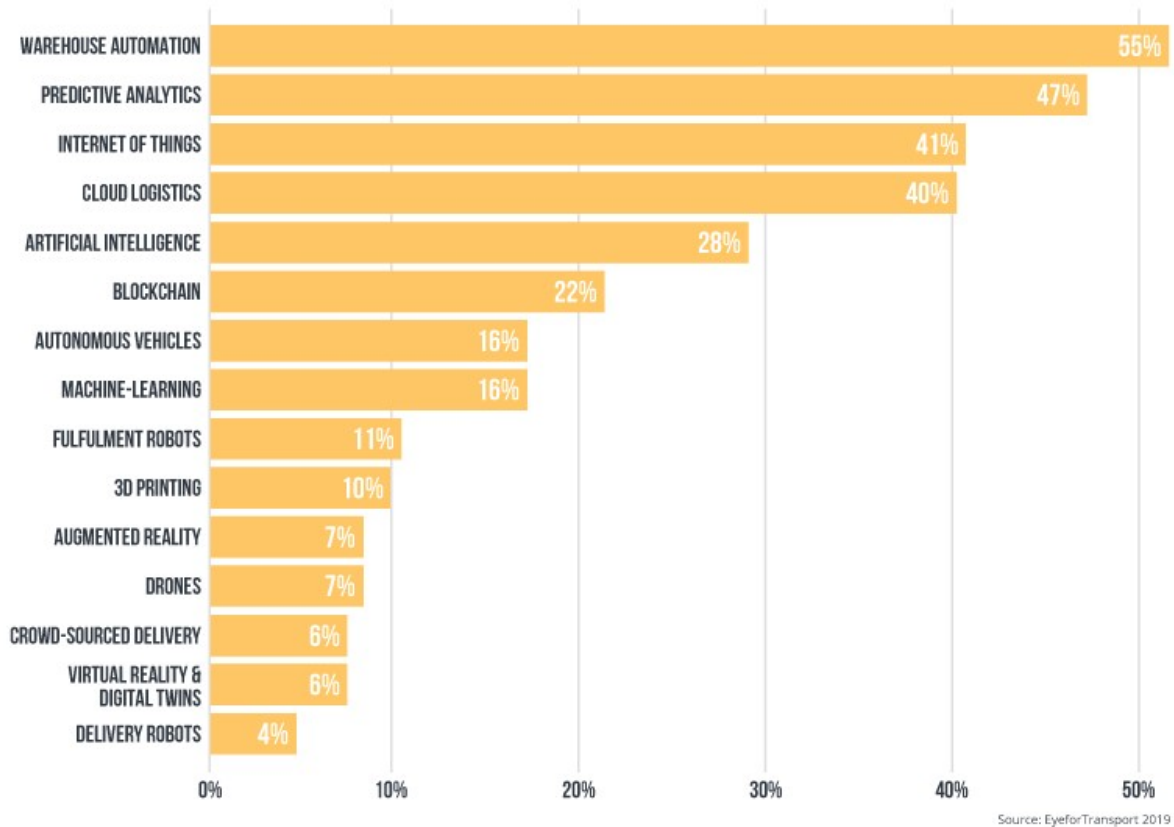
The future of Supply Chain Automation:

The next evolution of the digital supply chain is coming fast. We all knew automation was here to stay, but we can expect to see it proliferate since the pandemic has altered supply chains across the globe. With supply and demand changing so quickly and unpredictably, manufacturers with the most agility in their processes will be the ones most able to adapt. That is the driving force behind the increased interest in automation.

5.1 Keeping up with the global market:

Regardless of where we stand, the global economy has been quite chaotic recently. Not only are all of the normal processes in a supply chain much more difficult on a worldwide scale, but there are a wide array of regulations an operation has to follow when working globally. A supply chain needs to be very agile and able to quickly conform to changing global requirements. When the future is as uncertain as it is in the current international market, we need to be able to change direction quickly. Right now, there is already an overwhelming number of options available when considering the order and delivery channels for your supply chain to leverage. A supply chain must have the ability to organize orders coming in from a wide array of channels without slowing down. Possessing enough data visibility is another critical part of this issue. We need to be completely in tune with how our supply chain works in order to find the best possible channel to serve our operation's needs.

5.2 Future technologies: Percentage of retail, manufacturing & logistics professionals who are currently investing in the following-



5.3 Limitations of Supply Chain Automation:

Supply chain automation comes with a host of benefits, but our little robot friends still cannot compete with a human employee in a variety of vital functions. While many enterprises are embracing supply chain automation, there are some holdouts waiting to see how things shape up.

- Warehouse robots in current supply chain automation set-ups are very efficient and accurate when it comes to navigating their environments and grabbing the right products, but they lack dexterity.
- Cost of Robotization: Another one of the main reasons some operations are holding back on supply chain automation is the cost of entry.
- Supply chain automation is a great foundation to boost your efficiency, but you're still going to need a human touch to stay competitive. An AI assistant does not have the power or forethought to speak with a sales representative and knows that a big purchase is coming down the line due to how the conversation went.

6. Conclusion

Within the scope of this research proposal, the discussion concentrates on the potential benefits of Supply Chain Automation from the supply chain management viewpoint. Furthermore, the origin of the benefit, whether it is from the technology or from the process change or from both is difficult to separate. Also, the fact that each supply chain has its own unique characteristics adds to the problem; there is a lot of variety in supply chain automation applications in different organizational situations, and even in similar situations there are lots of differences. It's easy to look at the numerous implementations of supply chain automation in supply chain management and feel overwhelmed by the technological possibilities. Advancements in automation including artificial intelligence (AI), robots, and the Internet of Things (IoT) are changing the game across many industries, including the supply chain. Today, computers are far better at managing other computers and, in general, inanimate objects or digital information than they are at managing human interactions. However, automation alone isn't going to help one organization dominate the entire market. Automation should not be viewed as our enemy, but rather a tool that can help organizations scale their business without scaling the associated chaos. It seems clear that it is not a matter of "if" but "when" robots and other automated technology will be working in our distribution centers, warehouses, and manufacturing centers. Looking ahead, supply chain leaders should prepare their processes and infrastructure to embrace new technology and its ability to harness more data than ever before. However, their integration can have transformative effects for your company and lead to new business opportunities due to increased production capacities.

References:

i. Niraj Chaudhari.

(School of Management Studies, KBC North Maharashtra University, Jalgaon, India.)

Impact of Automation Technology on Logistics and Supply Chain Management. *American Journal of Theoretical and Applied Business*. Vol.5, No.3, 2019, pp.53-58. doi: 10.11648/j.ajtab.20190503.12. Published on October 9, 2019.

ii. *Thomas Industrial Survey*- Examining COVID-19's impact on the industrial sector. (By-ROI Team), May 25th, 2020.

iii. QProducts & Services Team, Under the Direction of Paul Yadron, Sr. VP of Sales. ('Automation Is Not the Enemy: Systematizing Workflow in the Supply Chain'. Posted: 16/12/2019).