The Port of the Future: Smart. Autonomous. Integrated
Jacobsen Bruno – September 20, 2019
https://www.futuresplatform.com/blog/port-future

About 90% of the world's commodities are carried by the international shipping industry, annually. Liner shipping also transports around USD 4 trillion of goods yearly. That's a staggering number when you stop to think about it. Of course, all these ships have to depart and arrive somewhere. There are more than 8,000 thousands of ports in over 200 countries worldwide. Here are their current challenges and future trends.

Port of the future

All over the world, ports handle over 700 million TEU annually. A TEUs are twenty-foot-equivalent-units, which is roughly the size of a standard shipping container. So in other words, yearly, the equivalent of 700 million standard shipping containers are loaded and unloaded in ports.

Not surprisingly, the biggest ones are located in Asia and the majority of the top 10 in China. The biggest one, the Port of Shanghai, handled around 37 million TEU in 2016. That's roughly 100,000 per day. Neighboring Singapore has the second biggest port, which handled 30.9 million TEU in the same year.

Despite their significance for world trade, they are not always up to speed with the latest technologies. According to McKinsey, they have been adopting automation more slowly than comparable sectors, such as warehousing and mining.

In addition, ports face several challenges. In overcoming, they will emerge as new beasts - still monumental but cleaner and more efficient.

According to Deloitte, among the several challenges currently facing the port and shipping industry, we can include the increasing complexity of operations, increased pressure on revenues and costs, and the same type of transition to different types of energy afflicting many other industries.

To solve the aforementioned challenges, ports will have to adapt to a new order. More specifically, they will have to focus on big data analytics to address increasing complexity. To manage operating costs, automation and predictive maintenance will also play a key role. (Predictive maintenance can make use of drones, for instance, as envisioned by Kalmar.) Finally, they will need to continue the transition towards renewable energy and alternative fuels.

The future port will address all these issues. In a way, we have already seen a few ports beginning to make this transition.

One example is the Chinese port of Caofeidian. According to Safety4Sea, the port, which handles around 300,000 TEU per year, strived to become the first fully-autonomous harbor by the end of the year of 2018.

But it's not alone in its push for autonomy. In the Chinese port of Shanghai, the biggest automated container terminal in the world has already opened. Instead of workers, operations are run by 26 bridge cranes, 130 autonomous vehicles, and 120 rail-mounted gantry cranes, all of which will be remotely controlled.

But the Chinese are not the only pioneer. In the Netherlands, the Port of Rotterdam, Europe's largest, is also getting some upgrades. According to Raconteur, port authorities, together with Cisco, are working to create a digital platform that will replace traditional radio and radar communications between the terminal and the ships. This means it will be able to receive autonomous vessels by 2025, as IoT sensors collect data on external conditions, helping crew-less ships dock.

By becoming the smartest port in the world, they hope to save operators up to $80,000 every time they dock a vessel.

Indeed, according to McKinsey, there are several benefits for automating ports. They are safer, less prone to human-related disruption, and their performance becomes more predictable.

But, according to the consulting firm, the port of the future won't just be more automated. In their definition of Port 3.0, humans are there only to manage exceptions. In Port 4.0, this goes even further. This is where every player in the ecosystem is connected.

Ships, containers, terminal operators, trucking companies, railroads, etc. will all be connected and operate as one synchronized ecosystem.

Through artificial intelligence, advanced analytics, and dynamic scheduling, the entire ecosystem will not only operate flawlessly. It will also constantly improve itself - with continuous optimization becoming an important driver.

Even blockchain will have a role to play. It will be an essential technology in connecting the different systems currently used by shippers, port operators, logistics companies, and so on. It will be able to do it securely, accurately, and transparently.

Ports are indisputably important. They are a key player in a game that moves trillions and trillions of dollars every year. And, as we have seen, they have been lagging a little behind other comparable industries.

But now they are transforming faster than ever before. The port of the future will be almost entirely, if not completely, automated. Artificial intelligence, advanced analytics, dynamic scheduling and pricing, predictive maintenance, self-driving vehicles, and the blockchain will be among the key technological drivers of this change. A change that, eventually, will be ecosystem-wide, not limited to ports alone.

It won't be today. It won't be tomorrow. But the investments seen in the Port of Shanghai or the Port of Rotterdam, in shipping lines such as Maersk, or cargo handling companies like Kalmar, give us a picture of a fertile ground for innovation and an industry ripe for change.