

Enabling the Digital Transformation of the Manufacturing Industry

The Fourth Industrial Revolution (Industry 4.0) is powered by data capture, the inter-exchange of data, and data analytics to implement data-driven strategies on the shop floor. The digital transformation of the manufacturing industry plays a crucial role in managing data and implementing Industry 4.0 strategies such as predictive maintenance or remote monitoring. This is why approximately [81% of manufacturing enterprises](#) plan to create and increase budgets dedicated to utilizing digital technologies.

The increased investment in digital technologies takes into consideration the hardware that powers digital transformation initiatives through data collection. Here, the Industrial Internet of Things (IIoT), smart electronic devices, and wearables all have crucial roles to play. These roles cut across collecting data and enabling communication or collaboration within the modern shop floor.

To successfully capture data and aid collaboration, these devices must be protected from the effects of the harsh industrial manufacturing environment they function to ensure the safety of the shop floor. This whitepaper will explore:

- The challenges the consumer packaged goods (CPG) and the industrial manufacturing industries face with implementing digital transformation strategies.
- The importance of safety within the average manufacturing shop floor.
- How industrial smart devices enable the implementation of digital transformation initiatives and enhance safety on the shop floor.
- Integrating Industrial Tablet Cases to enhance shop floor safety and implement digital transformation strategies.

Challenges with Implementing Digital Transformation in Manufacturing Facilities

~~“Approximately 13, 455, 000 workers in manufacturing are at risk of fatal and nonfatal injuries.” The National Institute for Occupational Safety and Health (NIOSH)~~

The digital transformation of the shop floor is expected to solve many operational challenges within the shop floor. According to statistics [manufacturers intend to leverage digital technologies](#) to:

- Reduce risk and improve safety on the shop floor
- Improve productivity
- Predict and address maintenance issues
- Improve customer services
- Optimize decision-making

To achieve these implementation goals, enterprises must first navigate through the challenges associated with developing a successful digital transformation strategy. The diverse challenges manufacturers face can be linked to the specified digital transformation goals they intend to achieve. Table 1.0 showcases the links between strategic implementation goals and their specific challenges.

Implementation Goals	Digital Transformation Challenges
Reduce Risk and Improve Safety	Inadequate hardware protection, Difficulties in choosing the right supportive hardware
Improve Productivity	Difficulties with choosing the right digital transformation software and hardware service providers.
Predict and Address Maintenance Issues	Challenges with finding technical talent to leverage data analysis, Difficulty with training available personnel.
Optimize Decision-making	Difficulties with hiring data scientists to drive analytics, and inadequate deployment of digital technologies.
Improve Customer Services	Difficulty with utilizing customer management

	platforms, capturing and analyzing customer-related data sets.
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Every digital transformation implementation goal comes with its practical challenges but only one directly impacts the safety of the shop floor – the use of inadequate protective solutions for your hardware.

With over 13 million workers at risk of injury in the manufacturing industry, governmental organizations have risen to this challenge by providing adequate standards and regulations to protect the average facility personnel. These regulations take into consideration the harsh environment and its impact on the workers managing manufacturing assets and the digital transformation equipment used on the shop floor. Using the CPG industry as an example, facility personnel must operate within an environment subject to:

- **Gaseous Emissions** – The industry makes use of diverse gasses and equipment to create seals, fill up packaging, and improve the shelf-life of the items they produce. In many cases, these gases may be hazardous to the personnel and equipment used in these situations. Hence regulations such as ATEX Zone 1, ATEX Zone 2, and Class 1 Division1 (C1D1) were developed to protect the atmosphere, working personnel, and hardware within these facilities. Many specifics of these regulations are designed to protect hardware from exploding in these environments.
- **Fine Powder or Dust** – Manufacturing processes that involve cutting or grinding raw materials, as well as, 3D printing produce powder and dust that are harmful to personnel and equipment on the shop floor. In humans, these particles may affect the respiratory system and for smart hardware such as tablets, they reduce touch-responsiveness and access to control features. Compliance policies such as ATEX Zone 21 and ATEX Zone 22, and Class 2 Division 2 (C2D2) provide guidance on working with and protecting hardware within environments susceptible to fine particles.
- **Oil and Grease Leakage** – The use of heavy industrial machinery within production lines means oil spillage has become second nature to manufacturing processes. A greasy environment puts personnel in danger and reduces the effectiveness of equipment such as tablets. Regulations derived from the Hazardous Location (HAZLOC) standards provide guidance on dealing with environments susceptible to leakages.

- **High Temperatures and Moisture** – Excessive heat can lead to combustion or the explosion of devices and moisture or liquid drops can cause electrical faults and fire within manufacturing facilities. ATEX 2 and 3 classifications such as the ones listed above provide compliance regulations focused on protecting hardware from excessive sources of heat and explosion.

These government regulations provide directions on the type of protection required to ensure safety on the shop floor. Compliance policies include the installation of safety devices and the use of ruggedized protective equipment for smart devices. For example, ATEX 2 and Class 1/Division 2 regulations outline the need for ruggedized protection for devices deployed where flammable gasses, vapors, and liquids exist.

Hardware Safety Challenges and their Effects on Implementing Digital Transformation Strategies

High temperature, gaseous emissions, and leakages obstruct the optimum performance of most digital transformation hardware deployed on the shop floor. Without adequate protection, smart devices such as Surface Go 2/3 and the 8th, 9th, and 10th generation iPad are unlikely to last for more than a few hours within the harsh environment of the shop floor.

In scenarios where fault lines begin to occur across hardware deployments and IoT frameworks, the data collection process is disrupted. Disruptions in decision-making will harm productivity and lead to safety issues on the factory floor. These safety challenges include:

- **Inadequate process monitoring** – Smart devices provide visualization dashboards that support condition and remote monitoring strategies within manufacturing facilities. A defective tablet will result in data losses and reduce the ability to monitor assets in real-time.
- **Fire Hazards** – In hazardous locations, where flammable gasses and oils are utilized, and the dangers of electronic devices exploding if they come in contact with hazardous materials results in safety issues within these environments.
- **Controlling Material Handling Equipment** – Automated guided vehicles or material handling equipment may sometimes malfunction on the shop floor. In these scenarios, technicians rely on smart devices to control errant AGVs. Hence, a defective smart device could hinder the real-time reactions to errant AGVs on the shop floor.

Industrial Tablets Cases as a Solution

The task of protecting smart devices from the harsh environment on the factory floor can be broken down into two categories – protecting devices in HAZLOC and non-HAZLOC environments. In hazardous locations or environments, the dangers to take into consideration are:

- Flammable Gas
- Combustible Dust or Powder
- Ignitable Vapor or Mist

Protecting tablets and smart devices from these dangerous by-products of the manufacturing floor requires a HAZLOC-certified casing. [ATEX and C1D2 regulations](#) guide the features required for an industrial case to function optimally within a hazardous environment. These features include heat resistance, aesthetic design to ease usability, and a ruggedized build. These features are expected to keep smart tablets safe from combusting due to external environmental influences and accessible to workers on the shop floor.

The dangers industrial and smart tablets face within non-hazardous locations or environments include:

- Climate Temperature
- Liquids, Water, and Moisture in Working Environments
- Oil and Grease
- A fast-paced shop floor

Protecting tablets and smart devices used within non-HAZLOC facilities requires using ruggedized protective or industrial casing with the capability to withstand harsh manufacturing conditions. Ruggedized cases ensure that smart devices are immune to the water droplets, moisture, dust, liquid, powders, and grease produced within a non-hazardous environment. Ruggedized protective cases are expected to also simplify access to control features on the device such as touch pads and knobs.

The Advantages of Using Industrial Cases to Protect Smart Devices

Protecting smart devices from harsh manufacturing environments is not the only advantage of utilizing ATEX or C1D2 certified protective cases on the shop floor. Other important advantages include eliminating the risks of breakage, increasing the lifespan of expensive devices, supporting the implementation of digital transformation, and protecting production line operators on the shop floor.

- **Reducing Breakage Risks** – Visualization smart devices such as the iPad series of tablets are expensive assets that must be protected to avoid re-investing thousands of dollars when defects occur. The use of ruggedized industrial tablet cases protects these smart devices from breaking when dropped from considerable heights.
- **Increase Device Lifespan** – Getting your money's worth from your digital transformation implementations starts with protecting the digital assets within your deployed system. Industrial tablet cases elongate the lifespan of the diverse tablets deployed on the shop floor. These tablets can keep conventional tablets running for years within harsh manufacturing environments where they are unlikely to last for a week.
- **Supporting Device Interconnectivity** – The interconnectivity of smart devices across the shop floor supports the implementation of digital transformation strategies. Ruggedized protective cases are expected to protect devices from the elements within the manufacturing environment thus ensuring tablets function at their optimized capacity to support data transfer and decision-making.
- **Protecting Production Line Operators** – Industrial cases ruggedized cases ensure operators have access to the complete functions of a deployed tablet or smart device. This access supports the ability to receive notifications in real-time to make instant decisions that reduce the occurrence of injuries on the shop floor. Customized industrial cases also come with secure handles and mounts that enable operators to utilize tablets without it affecting their work or causing safety-related issues.
- **Increase Productivity** – Optimizing productivity and operational efficiency is the goal of the digital transformation in manufacturing. Fully functional frameworks of smart devices provide everyone from workstations on the shop floor to the decision-making centers with access to manufacturing information. The application of protective cases ensures industrial tablets remain functional and accessible throughout the production cycle.

Choosing the Right Protective Case Provider

The right protective case provides the needed protection and access to smart devices and tablets deployed within the manufacturing floor –but the question of how to make the right choices must be answered. Making the right choice starts with the following considerations:

1. **Analyzing Your Environmental Requirements** – The first step to making the right choice is evaluating your protective requirements. This process involves analyzing the environment of your facilities and the government regulations associated with your manufacturing processes to determine the certified protective cases you require. This analysis will inform you of the regulations guiding protecting your devices in your facility's location.
2. **Evaluating Your Device Requirements** – Your requirement analysis should also include installation locations and methodologies which will decide if you require a mount or handles for placing devices in protective cases. Hence, the shapes of your tablets and smart devices must be considered when choosing a protective case solutions provider.

The mounting location will determine the activities required for setting up your tablets, the supporting handle shapes and if dedicated mount stations are needed. A proper mount station protects the smart device from harm and ensures devices are accessible to the end-user. An accessible dedicated mounting location also ensures technicians do not have to navigate shop floor traffic to utilize data collection or information points.

3. **Choosing a Solutions Provider** – When searching for a solutions provider, your search must focus on selecting technology partners with a track record in your industry. For example, tablets attached to or mounted on CPG equipment may require some form of customization on the protective case to fit specialized equipment. Choosing a provider with a track record of meeting the certification guidelines and customization requests of your industry will simplify the usage process.

Evaluating After-sales Support – In scenarios where further support is required to develop and use both custom and generic cases, a supportive solutions provider will simplify your deployment of protective cases. You can evaluate the after-sales support the provider offers by going through reviews of previous customers before deciding to work with a protective case solutions provider.

Taking the Next Step

The right service provider for the protection of your smart devices and tablets must be capable of providing turnkey solutions that meet your industry-specific requirements. These turnkey solutions must consider the protection regulations associated with your industrial environment, device aesthetics, mounting location, and mounting equipment. The solution must support the easy set-up of static device stations and the ability to safely access devices on-the-go. With such turnkey solutions, the shop floor will be equipped to handle the interexchange of data Industry 4.0 requires.

The static device stations ensure seamless interconnectivity from protected devices with centralized storage locations such as the cloud and on-premise data storage facilities. Conversely, access to safe, ruggedized tablet cases ensures smart devices can be used across every aspect of the shop floor to receive and send real-time data to enable remote monitoring, predictive analysis, and process control activities.

Comprehensive turnkey solutions should also come with a feasibility analysis to determine the best locations, accessories, and mounting gear needed to protect your tablets and increase their efficiency and lifespan. The example of a machining manufacturer highlights the crucial safety and accessibility support industrial protective cases provide,

The Challenges – The machining facility struggled to successfully expand its IoT data capturing framework due to the harshness of its manufacturing environment. Although it had previously installed industrial tablets, these tablets were hard to reach and needed constant maintenance thus hindering the data collection and control process. To solve these operational problems, the manufacturer underscored the need for extensive protection for its current devices and the new devices the manufacturer intended to include.

The Solution – To ease the device safety issues it faced, the manufacturer approached aXtion to provide a turnkey protective solution for both its industrial and conventional tablets. The solution was expected to solve the device location challenges, protection challenges, and ease of access problems it faced. After consultations, aXtion identified proposed these solutions to ease these challenges:

- aXtion Extreme Cases – Ruggedized protective cases with waterproof, moisture-proof capabilities for industrial and smart devices to protect devices within ATEX 2 and Class 1/Division 2.

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- aXtion Volt – Wireless charging stations to ensure the continuous charging of smart devices within mobile stations or in fixed locations.
- MagConnect HD Mount Line – A mounting system to enable accessibility and mounting tablets in hard-to-reach locations.

The Results – aXtion provided the required services to ease the installation and deployment process for the machining enterprise. The turnkey solution reduced the manufacturer’s constant device maintenance schedule by 50% and the mounts ensured technicians could easily access smart devices at need.

aXtion protective cases empowered the manufacturer to successfully deploy conventional smart devices including iPads, Surface Pro, and Samsung Galaxy Tabs within its harsh environment without problems. These devices which survive for just a couple of days within the machining environment continue to function optimally due to the use of aXtion industrial protective solutions.

Taking the next step to protecting your industrial devices, tablets, and improving operational efficiency within your shop floor starts today. Kick-start the protective process by speaking with an aXtion representative today!