

# Digital Transformation in Apparel Industry:

How to Improve Efficiency in Apparel  
Factory Supply Chain



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# Executive Summary

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Digital transformation is a process to integrate digital technology into different industries and transform businesses by replacing manual processes with the digital technology. It has been an inevitable trend which is happening in every industry, including the apparel industry.

Digital transformation process in the apparel industry, especially in the manufacturing end, is relatively slower compared to other industries, such as ICT, media, and finance, as fewer IT talents join this traditional industry. Meanwhile, family-owned factories often resisted changes. However, as the pressure from apparel brands to reduce cost is increasing and consumers are increasingly shifting toward fast fashion, apparel brands need to manufacture more diverse products in smaller units. In addition, the labor costs continue to increase in China and ASEAN countries, forcing apparel brands to come up with a different approach to lower costs. Digitalization is one of the best options to achieve the goal.

The COVID-19 pandemic has re-shaped how managements see their business, while at the same time expedite the digital transformation process. In 2020, the global spending on digital transformation technologies and services is forecasted to grow by 10.4% to USD 1.3 trillion, and the growth will be further accelerated due to the pandemic.<sup>1</sup> Therefore, we have seen more and more apparel manufacturers taking this opportunity during the factory lockdown and starting the journey of digitalization by adopting IoT and Smart Factory.

This white paper covers the evolvement of the apparel industry toward digitalization and show industry players the hardware, software, and IoT integration through several case studies. Finally, we will demonstrate the outlook and the steps toward the digital transformation for the apparel industry players.

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<sup>1</sup> Data by International Data Corporation



# Digitalization Transformation in the Apparel Industry

## A | The Need of Cost Cutting Drives the Transformation

**The apparel industry's manufacturing market is gradually moving from China to ASEAN countries, while digitalization has been acknowledged as the new approach to reduce cost.**

The apparel industry has long been considered traditional and non-tech savvy since it is highly labor-driven. However, the invention of the sewing machine in the 18th and 19th century had had significant impacts on the industry. Firstly, it brought relief to the thousands of housewives who made their own clothes. It also made clothing production much easier and cheaper, which led to the beginning of the clothing and fashion industry.

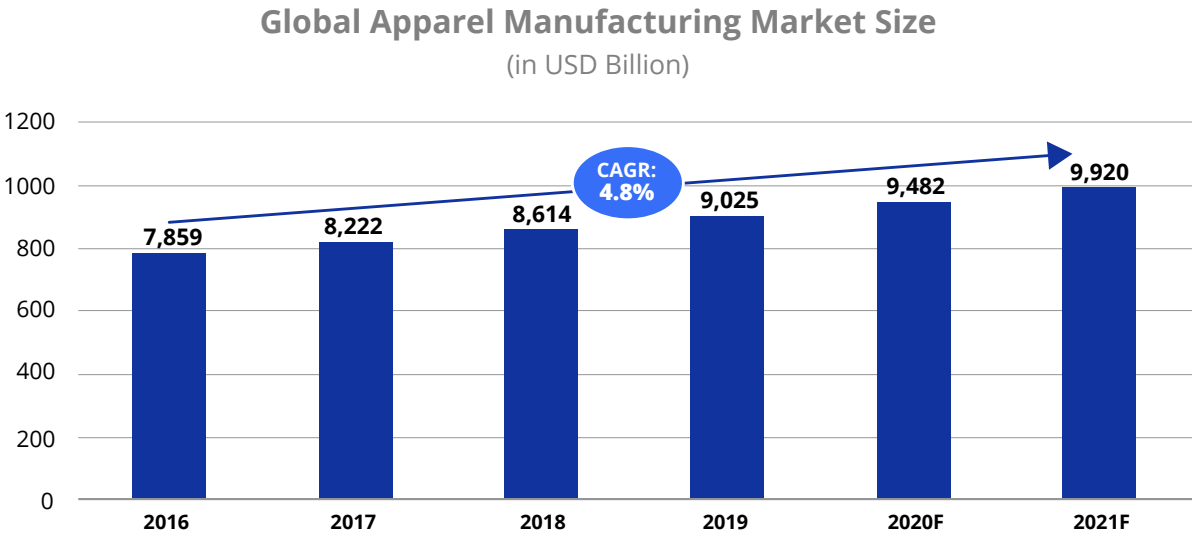
The advancement of sewing machines and the expansion of garment factories carved out the path of digitalization in the apparel industry, which was followed by the moving of production factories to Asia to enjoy the cost advantage.



The market size is estimated based on the value of domestic production plus imports minus exports, all valued at manufacturer's price. The value of the global apparel manufacturing market totalled USD 948.2 billion in 2020, up by 5.1% from a year earlier. The market sizing of the apparel manufacturing market is expected to reach USD 992 billion in 2021, a 4.8% increase since 2016. The Asia-Pacific region accounted for more than half of the market value.

In Asia, the apparel industry is thriving although it remains difficult to dominate the industry due to the amount of competition. China still has a considerable amount of expertise in the industry, along with decades of experience, modern infrastructure, efficient supply chain management, and high productivity. However, China is no longer the only and cheapest option nowadays, as other Asian counterparts have provided a range of sourcing choices for apparel factories. For example, Sri Lanka, Pakistan, and Bangladesh offer lower costs of domestic supplies, as well as cheaper labor costs. Meanwhile, the textiles and apparel industry are actively supported by the government in Indonesia and Vietnam. Finally, India – which has a diverse and integrated fabric and apparel ecosystem – is expected to be the “next China” in terms of its role the apparel supply chain.

However, the offshoring model regardless of the country is hardly compatible with the rising labor cost. In addition, migrating from the concept of cutting down the labor cost to production efficiency enhancement, which can be easily achieved with the help of digital transformation, appears more fitting as a long-term strategy. From the widespread e-commerce platform, knowledge of IoT, and the adoption of Industry 4.0 among different industries; all the mentioned trends are indicating a foreseeable future for countries like Vietnam, Sri Lanka, India, and Bangladesh to emerge as fast adopters of digital transformation technologies in the apparel industry.



Source: YCP Solidiance's Research and Analysis

## COVID-19 speeds up the digitalization process, following an increased awareness among brands and manufacturers.

The COVID-19 pandemic brings more attention to the digitalization approach in the apparel industry and further speeds up the progress from what initially would be happening in 5-7 years to 2-3 years as indicated by the former head of design at Zilingo. As the retail business is one of the most affected sectors during the pandemic, so is the fashion brands' retail business, with manufacturing factories were being forced to shut down. For example, Bangladesh has decided to impose a zone-coded lockdown. A similar policy also took effect in India. As a result, the apparel industry lost over 70% of functions due to the COVID-19 pandemic, with total sewing machine operating hours in four countries; India, Bangladesh, Vietnam, and Indonesia, having fall to 27% in April 2020, less than half of those in February.

During the pandemic, the affected factories with a higher level of digitalization suffered from minor damages for two reasons:

- Plants with higher digitalization level have shown better flexibility in order changing, thus the cooperating brand can amend its strategy and immediately put a new order
- Better management of the resources would help the brand understand the feasibility of their suppliers and further amend the strategy and number of orders to avoid big losses and unnecessary waste



As lots of factories have been forced to shut down, many of them took the chances and used the resting period as an opportunity to adopt digital transformation, without having to make big changes in management. Compared to February, the number of operating sewing machines in Asia returned to 70% in June 2020. Although the operating ratio remained below 60%, it has been on an upward trend since April. The only approach to be feasible amid uncertainties as mentioned is to “be capable of visualizing the capacity and taking advantage in negotiations.” Hence, digitalization became the method that every manufacturer and brand were working toward, with a more significant growth was expected after July 2020.

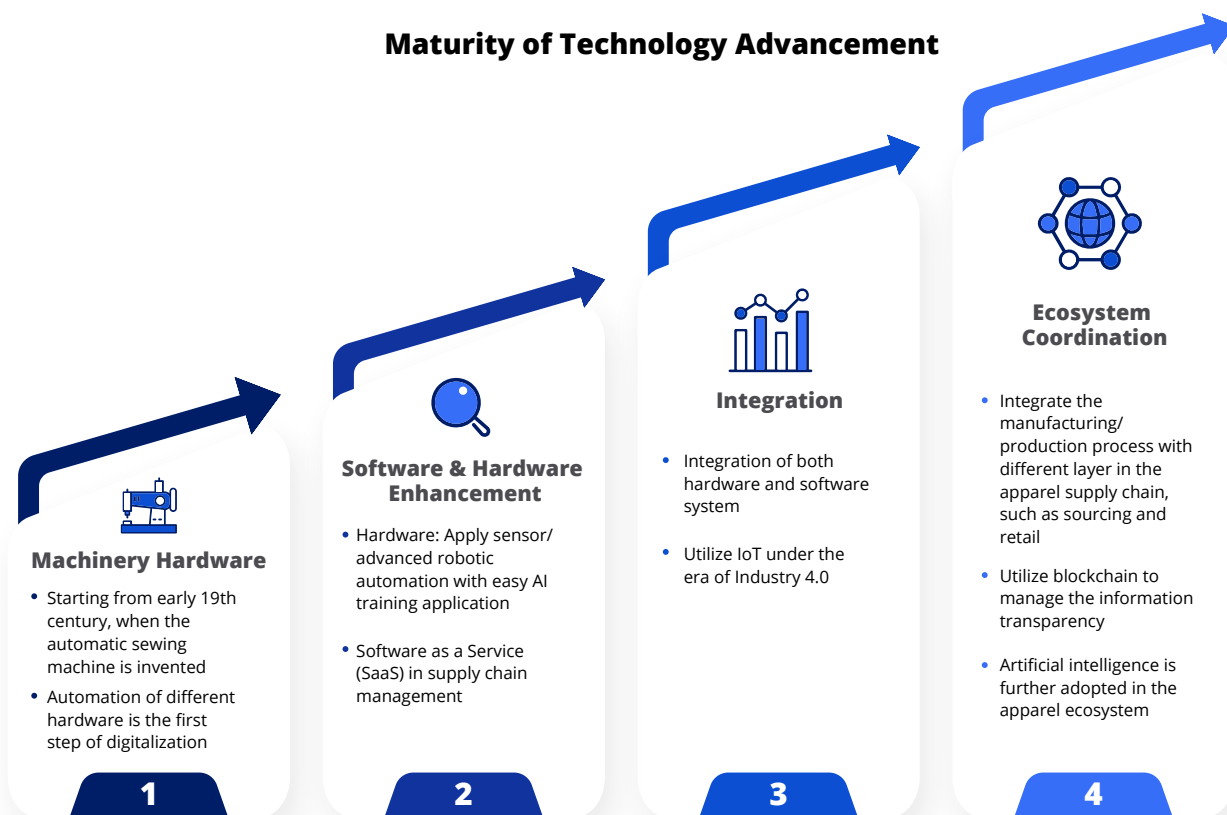


## B | The Evolvement of Digital Transformation in the Apparel Industry

**Digital transformation journey starts from automated machinery, passing the IoT integration and aiming at ecosystem coordination.**

Digital transformation is a long journey across all industries, which all starts from the hardware technology advancement. In the apparel industry, the invention of the sewing machine was one of the most important steps toward digital transformation. To further decrease the labor density, the hardware evolvement would be applied with different technologies such as a smarter AI-driven cutting laser or a data-collective sewing machine. On the other hand, there are another group of players who would start to develop software and IoT solutions to manage the supply chain and the factory operation. The second stage of the evolvement usually takes most of the time, and the players of hardware and software do not have much connection and linkage with each side. Only until the level of development is similarly equivalent between hardware and software, the third stage's players would start to integrate systems in each layer of the apparel manufacturing supply chain.





Source: Brother Machinery (Asia) Limited

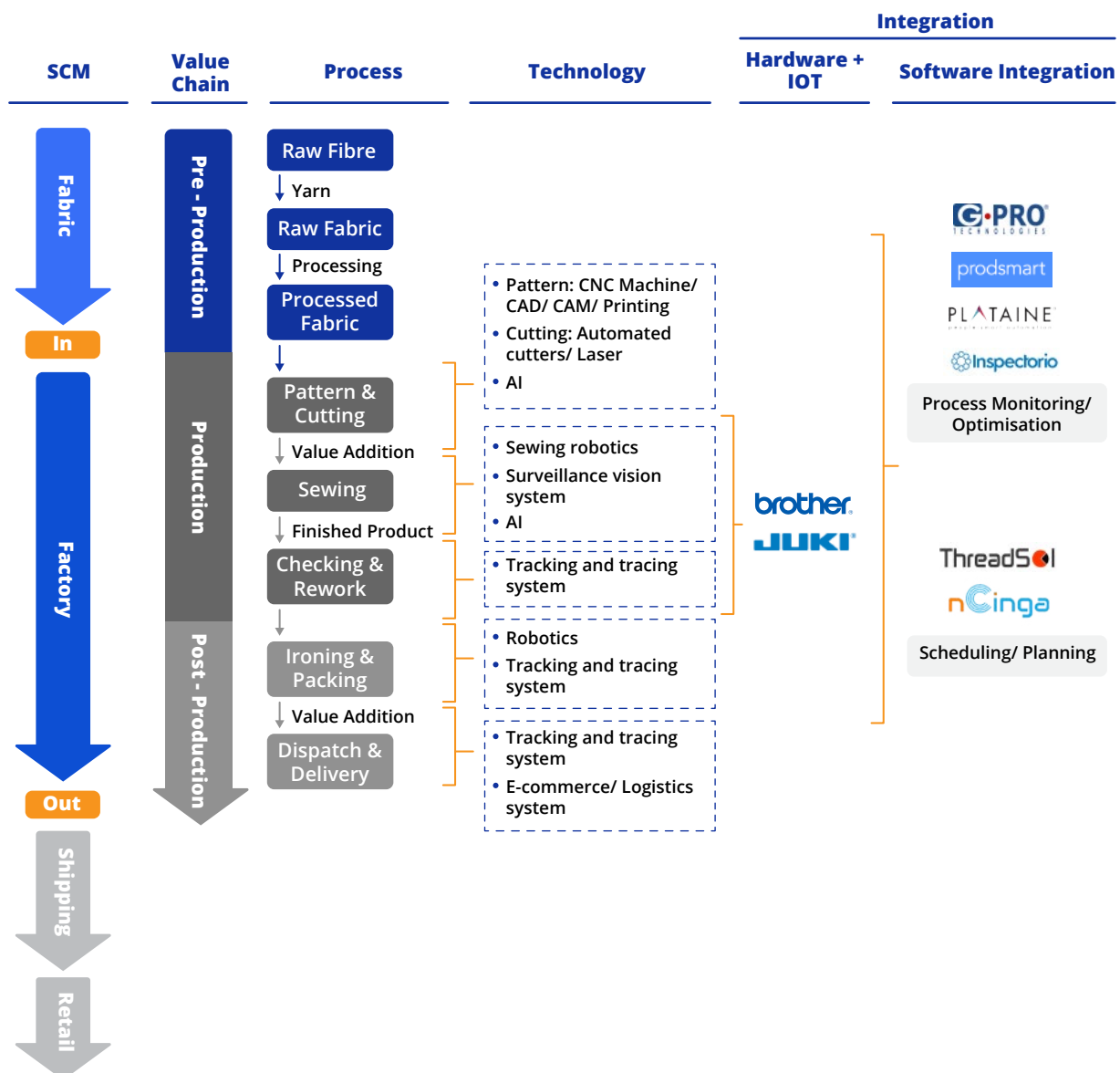
The integration of hardware and software would maximize the power of data and further enhance the efficiency of the manufacturing production, toward which the apparel industry is currently moving. Some of the hardware players are providing integrated solutions for apparel factories, such as Brother and JUKI. In the foreseeable future, the whole industry's supply chain -- which is not limited to production line but covers each stakeholder in the ecosystem such as logistics and retail -- would be coordinated into a software system linked with hardware. The AI technology is expected to enhance the system in both software and hardware -- which is the forth stage in the Evolvement of Digital Transformation in the apparel industry ecosystem coordination.



# The Digital Transformation in Apparel Industry's Supply Chain Management

The value chain of the apparel industry can be categorized into three segments – Pre-production, Production, and Post-production.

Pre-production is mainly for material sourcing and preparation, which has a lower level of digitalization since the cost of material differs by brands and countries. Production, which takes most of the product cost, is the main process to be digitalized. Different technologies in hardware and software are applied and updated especially in the cutting and sewing process, which leads to the creation of various integrated solutions to ensure every processes' real time information can be noted down for analysis.



Source: Brother Machinery (Asia) Limited

## Production Process in the Apparel Industry

As shown in the graph above, the production process covers pattern and cutting, sewing, and checking & rework in the apparel supply chain, and is also the process with the most potential to be digitalized.

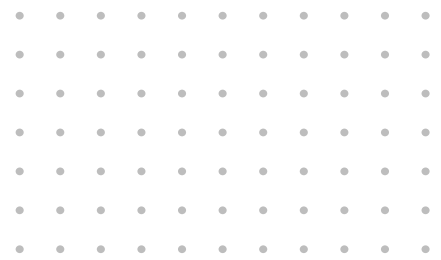


### Pattern & Cutting

Pattern & Cutting, the first step of production, involves a lot of different technologies and innovations being applied to the hardware machinery. Continuous cutting is possible with the NC machine (numerically controlled machine), as nowadays technology has brought in the computer NC machines (CNC machine) and the supporting programs (CAD/CAM). However, if only focus on the cutting technology, there are ways and tools such as knives, lasers, water jets, plasma, and ultrasound depending on different cutting styles. Therefore, the main areas of current innovation in cutting are related to elaborated sub-functions or supplementary assistance to the existing cutting technology, whichever can increase the productivity, versatility, and pattern-matching capability.

For example, the automated cutter made by Kuris Spezialmaschinen GmbH in Germany is equipped with an additional cutting device and crossbar, which performs synchronized and simultaneous cutting that can reduce the cutting time by 40% to increase productivity.

Meanwhile, the automated cutter presented by Zund Systemtechnik AG from Switzerland allows users to change the cutting device interactively. The automated cutter includes electric or pneumatic oscillating tools, rotary or knife blades, laser modules, perforating or creasing tools, and marking or plotting modules. They also have their software solution incorporated, which further segments the cutting process into “pre-cut”, “digital cutting” and “post-cut”. With the software’s production monitoring, the data imported from the previous CAD design and the planning system would be directly linked to the cutting machine. As the data is recorded real time during the cutting process, the analysis based on the process can further improve the efficiency and increase the transparency of the operation.



Meanwhile, the pattern matching capability is one of the most time- and labor-consuming steps before the actual garment-making process. It will also produce a lot of waste of unnecessary material between rough and fine cutting. To improve the accuracy of the pattern with less waste, the on-screen image projection on the fabric surface before cutting would be crucial.



## Sewing [Hardware]

As sewing represents 35 – 40%<sup>2</sup> of the total apparel manufacturing cost, the sewing process becomes one of the processes from which every stakeholder would like to start cutting costs.

In the past decade, sewing manufacturing factories were located in developing countries. However, the strategy proves harder to maintain as more and more brands are planning to centralize their production line, and the labor market in Asia is no longer the cheapest. Therefore, digitalization is the new approach to reduce cost in the long run, especially post-COVID-19 pandemic.

The production process of sewing can be divided into two sub-functions – handling of material and joining of fabric components. The material handling process indicates the transporting work from one place to another including lifting, moving, mounting, repositioning, and the storing of WIP (work in progress). The progress is usually done manually that only 21%<sup>3</sup> of the plants adopt a semi-automatic system.

<sup>2</sup> Minyoung Suh (2020). Textile World – Automated Cutting & Sewing Developments

<sup>3</sup> Szimmat, F. (2007). Contribution to the separation of plane bending sliders components. Stuttgart, Germany: Fraunhofer Society



Since the handling process takes 79% of the total production time and nearly 80%<sup>4</sup> of the cost is related to handling, a lot of material handling systems are generated by different requirements. The material handling equipment exists in different parts of the supply chain, including cutting, sewing, finishing, in addition to various systems from relatively simple moving belts and manual push-pull rail systems to extremely sophisticated, computer-controlled automatic overhead conveyors.<sup>5</sup> There are also some innovative systems such as the Toyota System-style (TSS) quick response methods and the unit production system (UPS). More innovations with robotic arms for material handling have been introduced in recent years, although not yet commercialized to the factory level.

For the fabric joining process, sewing is the most common approach which represents 85%<sup>6</sup> of the joining methods. Sewing is also highly labor intensive and takes 35 – 40% of the total production cost, encouraging a lot of innovation in sewing automation. One of the most popular approaches is to assemble the sewing machine with fabric processing machinery such as a winding or calendaring unit. An automatic bobbin changing system would also increase efficiency in sewing. For example, RSG Automation Technics GmbH & Co. KG from Germany presents the automatic bobbin exchanger with a patent.

The key to advancing the automated sewing system is to do more than one production task and reduce the wasted time in material handling. For example, Shenzhou International Group -- China's largest exporter of knitwear with customers including Nike, Adidas, and Uniqlo -- shared that they not only create the sewing module for a big amount of orders but also automate the original sewing machine from Brother and JUKI by robotics which only requires one person to manage three sewing machine. The automated sewing process does not only reduce the labor cost, but also ensures accuracy and quality.

<sup>4</sup> Gries, T. and Lutz, V. (2018). Application of robotics in garment manufacturing

<sup>5</sup> Wendosen S (2019). Study on Automation of Material Handling in Sewing Section to Enhance Cost Effectiveness

<sup>6</sup> Gries, T. and Lutz, V. (2018). Application of robotics in garment manufacturing



## [Hardware + IoT]

**In addition to digitalizing hardware, the integration with IoT is also a popular approach in the sewing process.**

In the digital transformation revolution front, Brother and JUKI are the two major players which provide an integrated IoT system along with their hardware, with some small Chinese sewing machine brands trying to enter the space.

### Case Study - Brother Machinery (Asia) Limited

Brother Machinery (Asia) Limited (BMA) is responsible for the industrial sewing machine business and garment printer business in Asia. BMA has also introduced an integrated IoT system associated with their sewing machine, called **"NEXIO System"**, and its features are as follows:



**1) Production Piece:** A real-time action with back data generates proper communication with the product line to find the best solution



**2) Defect Analysis:** By using INS panel (tablet app), it eliminates paperwork and makes it easy to record and analyze defect type and count. Furthermore, Brother label printer can trace defect product.



**3) Productivity Improvement:** Provide cycle time, operation ratio, and production count for efficiency improvement

Especially during the COVID-19 pandemic, NEXIO System can collect data from one line in the factory while their specialist reports the productivity of the factory, including rankings for each operator in Asia and within the country. It is the best time to check the productivity with comprehensive evaluation and prepare for the foreseeable peak season.

	 Production Piece	 Defect Analysis	 Productivity Improvement
Supply chain management	✓		
Value chain	✓	✓	
Sewing area	✓	✓	✓

One of the clients from BMA is **May Hai Garment Joint Stock Company** (May Hai) from Vietnam, which sells sewing products with fashion wear, jacket and knitwear. May Hai adopted the NEXIO System and made a significant change with the small lot improvement. The system offered three things that improve small lot production;

- 

**1 Fast and accurate measurement**
- 

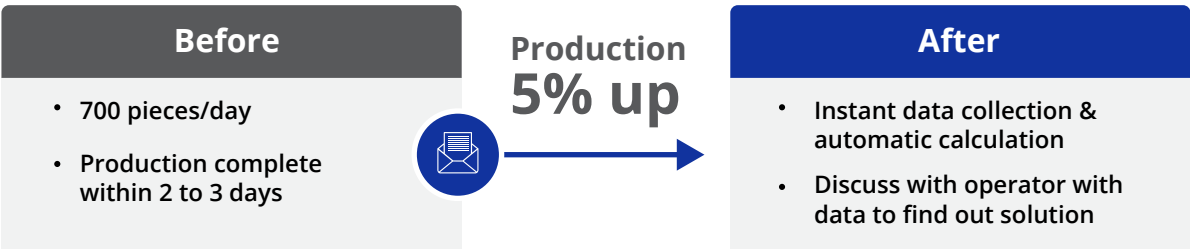
**2 Rapid reporting**
- 

**3 Data sharing among stakeholders**

*As the result, May Hai is able to increase productivity by a whopping*

**5%**

Based on Brother's survey on 66 factories with IE department, they found market potential to reduce manual work, which traditionally requires 40% of working time and US\$23,000 in one year, to 88% time and cost cut, or from 7,680 hours to 960 hours. Their product also offers the benefit of data collection to the customer.

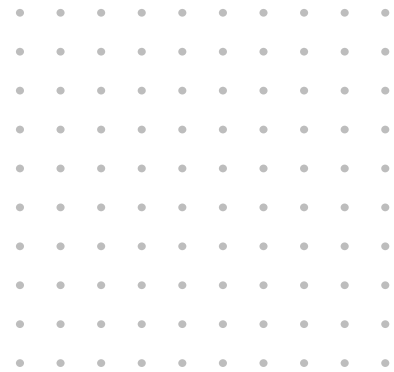


"We have studied many productivity management systems and chose Brother's NEXIO SYSTEM after all."

"Since using NEXIO SYSTEM, the output of workers, productions lines and factories have been updated regularly, accurately and promptly."

"Previously we spent 3-4 hours on inspecting and recording operation from workers for each product code, and we also had to review and refine the data. Now with NEXIO system, it only takes a few minutes on laptop."

"We can evaluate workers by working ratio index, monitor and analyse the balance of production line and find out the bottleneck quickly in order to increase productivity." ”



## Integrated Software

*In addition to the advancement of hardware and its IoT system, many players have presented integrated software solutions with different approaches.*

Although there are fewer mature hardware players who introduced their IoT solutions toward digitalization, more solution providers are joining the competition from the software's perspective.

To step into the competition to provide digitalization solution, Zilingo and Coats both chose the fastest way to strengthen the technology feasibility by acquiring a start-up company. They leverage on their inherent strategic partners and stakeholders in the apparel supply chain which includes manufacturers, retail merchants, distributors, and global brands. Thus, the high awareness among industry players would help them introduce their digitalization solution to the market, which echoed a view of Keith Fenner, the Managing Director in Coats Digital, "This is the beginning of an exciting new age for our software solutions offering. Coats Digital provides a clear and distinct focus and establishes that while Coats continues to be an industrial manufacturing company we are also innovating technologies of tomorrow to improve how the fashion industry develops, costs, sources, and manufactures products sustainably into the future."

Aside from providing various solutions, Zilingo and Coats are focusing more on the planning and scheduling ahead of the production, which aims at cutting time and money to optimize the final output. Meanwhile, several other players focus on the SaaS product solution with an actual automation optimization solution and customize their solution for different industries.

	GPRO	Prodsmart	Plataine	Inspectorio
<b>Business Coverage</b>	<ul style="list-style-type: none"> <li>Bring Industry 4.0 digitization to data collection, analysis, tracking and shop-floor processes</li> <li>Covered Industry: Apparel Manufacturing (main), Healthcare, Laundry, Logistics, Automotive, Facility &amp; Asset Management</li> </ul>	<ul style="list-style-type: none"> <li>Production floor tracking &amp; management in real time</li> <li>Covered Industry: Apparel &amp; Fashion, Automotive, Chemicals, Electronics, Food Production, Furniture, Medical Devices, Metal Parts ....</li> </ul>	<ul style="list-style-type: none"> <li>Smart Industrial IoT Software for Manufacturing Optimization</li> <li>Covered Industry: Aerospace, Automotive, Advanced Manufacturing, Furniture &amp; Upholstery, Wind/ Energy, Medical devices, Heavy equipment</li> </ul>	<ul style="list-style-type: none"> <li>Provide solution for supply chain to optimize quality and sustainability operations</li> <li>Covering different industries which includes apparel industry</li> </ul>
<b>Product Line</b>	<ul style="list-style-type: none"> <li>Shop Floor Data Tracking (SDT): WIP and production tracking</li> <li>Quality Control &amp; Management (QCM): Real time quality information</li> <li>Industrial Engineering Execution System (IEES): Pre-determined Motion Time System for labour costing, benchmarking and planning</li> <li>Proactive Scheduling &amp; Monitoring (PSM): Resources utilization and timely delivery optimization</li> <li>Simulated Line Balancing (SLB): Manpower/ machine requirement calculation</li> </ul>	<ul style="list-style-type: none"> <li>Prodsmart manufacturing execution system (MES): A mobile, paperless software solution that delivers the insight to track fabricating and manufacturing shop floor production and quality</li> </ul>	<ul style="list-style-type: none"> <li>Total Production Optimization: production quality and material tracking</li> <li>Material &amp; Asset Tracker: Material, equipment, and operation analysis</li> <li>Shelf-life Manager: optimal material selection</li> <li>Tool Manager: Tool usage real time tracking</li> <li>Fabric Optimizer: Create optimized cutting plans</li> <li>WIP Optimizer: Trak work advancement and process completion</li> <li>Production Scheduler: Create plan for resources and time scheduling</li> <li>Supply Chain Manager: for suppliers and customers view the supply chain management</li> <li>Quality Manager: Sensor data collection for quality control</li> <li>Manufacturing Optimization: Track from raw material to end-product</li> </ul>	<ul style="list-style-type: none"> <li>Sight: End-to-end quality control</li> <li>Rise: Environmental, social and health &amp; safety (COVID-19) compliance</li> <li>Konfya: Provide risk assessment tool and digital guidelines</li> </ul>



<b>Covered SCM</b>	<ul style="list-style-type: none"> <li>Pre-production: scheduling, resources optimising</li> <li>Production: QC</li> <li>Post-production: Pack to Ship</li> </ul>	<ul style="list-style-type: none"> <li>Pre-production: scheduling, waste control</li> <li>Production: QC</li> </ul>	<ul style="list-style-type: none"> <li>Pre-production: scheduling, resources optimising</li> <li>Production: QC and management</li> <li>Post-production: supply chain full coverage</li> </ul>	<ul style="list-style-type: none"> <li>Pre-production: scheduling, resources optimising</li> <li>Production: QC and management</li> </ul>
<b>Partnered Client</b>	<ul style="list-style-type: none"> <li>Prolexus, Sinwah Industrial, Paddock Jeans, Victus Sports, Li &amp; Fung</li> </ul>	<ul style="list-style-type: none"> <li>J3LP Groupe J3L, Sonafi, IG Masonry Support, Science4you</li> </ul>	<ul style="list-style-type: none"> <li>Siemens, Airbus, CTC, Airborne, STARK</li> </ul>	<ul style="list-style-type: none"> <li>Mango, American Eagle, CROSS</li> </ul>
<b>Key Successful Factor</b>	<ul style="list-style-type: none"> <li>(+) Moving forward to cover the supply chain (e.g. post-production)</li> <li>(+) Deep understanding in apparel industry</li> <li>(+) ASEAN/ Asia focus</li> </ul>	<ul style="list-style-type: none"> <li>(+) Easy to adopt with the APP</li> <li>(-) Hard to apply same solutions to varies industry without deep understand of it supply chain</li> </ul>	<ul style="list-style-type: none"> <li>(+) Segment different solutions with full coverage of the supply chain, and provide flexibility of modules customization</li> <li>(-) Hard to apply same solutions to varies industry without deep understand of it supply chain</li> </ul>	<ul style="list-style-type: none"> <li>(+) Focus on cloud-based SaaS solution for different supply chain</li> <li>(+) With COVID-19 health check/ monitoring system</li> <li>(-) Hard to apply same solutions to varies industry without deep understand of it supply chain</li> </ul>

**As shown above, players such as GPRO, Prodsmart, Plataine and Inspectorio as the software and solution providers are focusing on segmented solutions for different focused industries' supply chain manufacturers.**

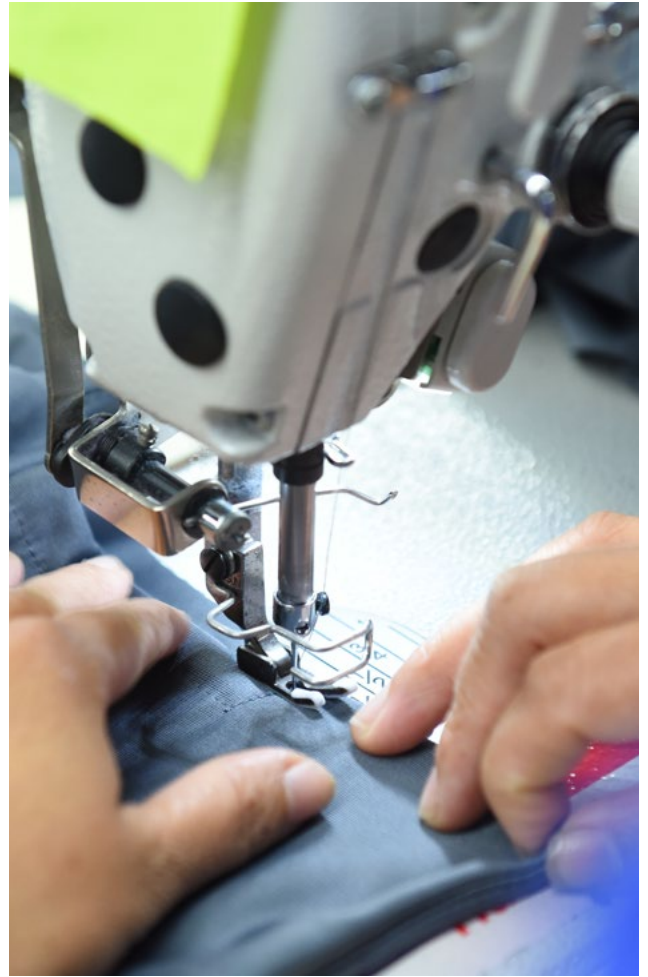
With the customized production solution in hand, most of the players would apply their system to different industries. Therefore, the key success factor for these players would be how they show their deep understanding on the industries they have covered. For example, GPRO has been developing its in-house proprietary software and hardware for the apparel industry in the past 20 years. Thus, it would be very convincing for their apparel manufacturing clients to adopt their solutions.

For better illustrating the solution as mentioned, several cases are presented with actual data as follows:

## Case Study - GPRO

GPRO is a leading RFID and Industry 4.0 solutions provider for industries including apparel and textile. Here is a case study of one of their clients, a state-owned garment manufacturing company located in Vietnam.

The company's production floors occupy a 16,000-square meter space and production facilities have monthly capacities of producing 540,000 pieces of jeans, 200,000 pieces of woven shirts and 230,000 pieces of casual and active pants.

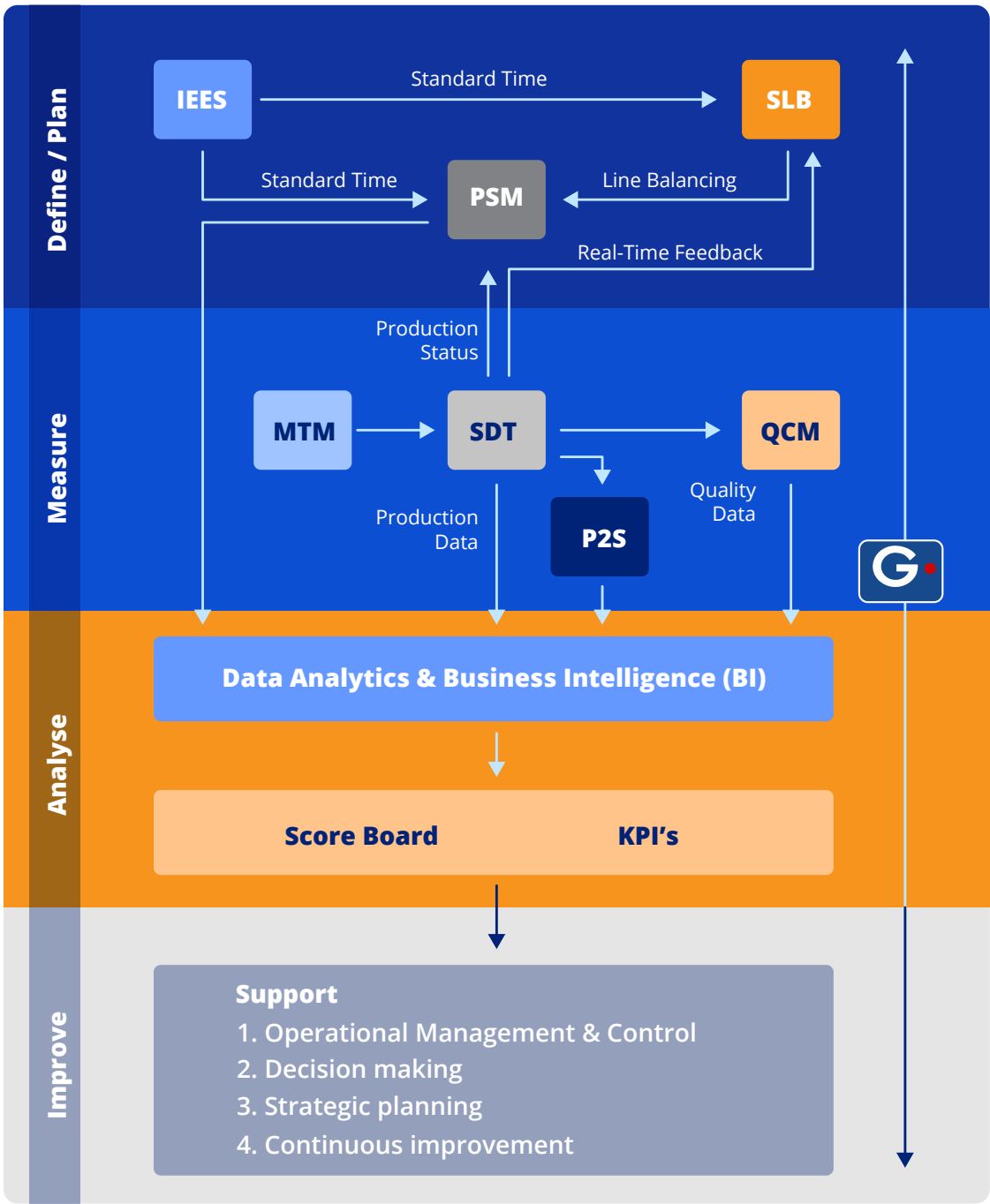


### Before implementing GPRO-SDT (RFID) System

- No visibility to management on the production floor: a manual tracking system called “job ticket system” was used to provide some forms of historical production data.
- Operators use paper tickets to track each bundle and operation performed, while the administrator would count the tickets the next day to calculate production quantities.
- There was a lack of real-time data. It was difficult for management to keep track of the production progress and promptly discover operational problems such as sewing errors, low efficiency, and high rejects.

### The objectives of adopting the GPRO-SDT (RFID) System

- To provide real-time, online data, analysis, and reporting capabilities
- To create visibility across the entire production facilities
- To support decision-making process of the management team
- To facilitate the administration of wage reform.



<b>IEES</b>	Industrial Engineering Execution System	<b>SDT</b>	Shoop Floor Data Tracking
<b>SLB</b>	Simulated Line Balancing	<b>QCM</b>	Quality Control & Management
<b>PSM</b>	Proactive Production Scheduling & Monitoring	<b>P2S</b>	Pack To Ship
<b>MTM</b>	Machine Tracking & Maintenance System	<b>G</b>	Group Work Flow Coordination & Feedback

Source: GPRO GLOBAL Sdn Bhd

## Results after applying GPRO-SDT (RFID) System

### Tangible results:

- Efficiency of sewers improved more than 20% at the end of two months
- Defect rate reduced by 30%
- Lost time reduced by 50%
- Machine down-time reduced by 30%
- Frequency of bottle-neck situation reduced by 80%
- On-time delivery improved by 80%
- Staff for data collection and computation reduced from 10 to 3 persons
- At 6 % productivity gain, the ROI was around 11 months

### Intangible results:

- Quality of data improved drastically (real-time, online data)
- Payroll computation and administration was made easier
- Wage reform for more equitable incentives and reward practices
- Creating visibility and transparency across the entire production facilities
- Improvement in customer service by tracking every single order
- A more harmonious and peaceful working environment facilitated by using accurate, objective data





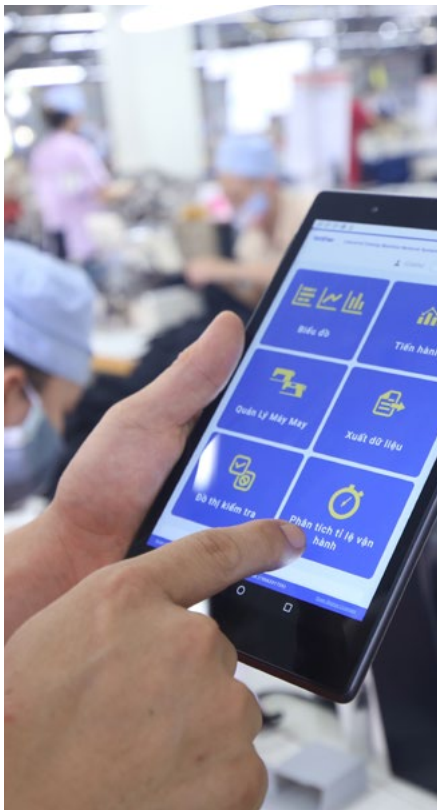
# Brands' Digital Transformation in Apparel Industry

## Brands' perspective in the journey of digital transformation depends on their product's characteristics.

As the apparel industry is on its way to digitalization, each of the stakeholders is actively reaching out for solutions and there is no exception for fashion brands. In fact, brands are the first stakeholder to initiate the trend of digitalization to the cut costs, while the manufacturing suppliers often have more concerns before adopting the digitalization process. However, different brands might have different concerns and attitude toward the trend, depending on the characteristics of their products.

DX level of Suppliers	Category of Brands	Partnership	Number of Suppliers	Supplier Turnover Rate	Attitude Towards DX
Higher Level of DX	<ul style="list-style-type: none"> <li>Sports Brand</li> <li>Brand with more fixed styles/ similar SKU</li> <li>E.g. Nike, Adidas, Uniqlo</li> </ul>	<ul style="list-style-type: none"> <li>Mostly strategic/ investment partnership</li> <li>Fixed and long-term ordering</li> </ul>	Few	Less than 5%	<ul style="list-style-type: none"> <li>As the apparel material is more fixed, brands would like to have high level of DX and cut the cost down</li> <li>Production for shoes and socks is approaching 80% - 100% automation</li> <li>Uniqlo has its own DX SCM system and all the suppliers are required to adopt it</li> </ul>
Middle Level of DX	<ul style="list-style-type: none"> <li>Between Fast Fashion and traditional/ big ordering brands</li> <li>E.g. H&amp;M</li> </ul>	<ul style="list-style-type: none"> <li>Half strategic partnership, half ordering-based partnership</li> <li>Middle-term ordering</li> </ul>	Some	5% - 10%	<ul style="list-style-type: none"> <li>More on the encouraging attitude as long as the cost is reduced</li> <li>Less investment towards manufacturing suppliers for DX adoption</li> <li>If the flexibility is lower down due to the DX adoption, the brand would prefer the traditional approach</li> </ul>
Lower Level of DX	Fast Fashion	<ul style="list-style-type: none"> <li>Mostly ordering-based</li> <li>Short-term partnership</li> </ul>	Many	10% - 20%	<ul style="list-style-type: none"> <li>Suppliers rely on the digital solution provided from the retail/ brand side</li> <li>The scale of the suppliers are smaller since they have lots of different design and fewer orders for each design</li> <li>Require high flexibility and efficiency</li> </ul>

**Instead of focusing on each layer of supply chain digitalization, brands care about their final output more.**



So long as the supplier can provide a solution with higher efficiency, higher quality, and lower cost, brands will be more than happy to apply digitalization. However, the fast fashion brands, which require more flexibility with fewer orders of each piece such as Zara, would need a more centralized digital solution, instead of adopting a long-term solution and ordering from a few suppliers. On the other hand, suppliers like Shenzhou International Group -- which is the biggest supplier of Nike, Uniqlo, Adidas, Puma in China -- apply digital transformation themselves as the brands they supply usually have similar SKUs, thus the innovation and the R&D cost will be more cost-effective in the long run.

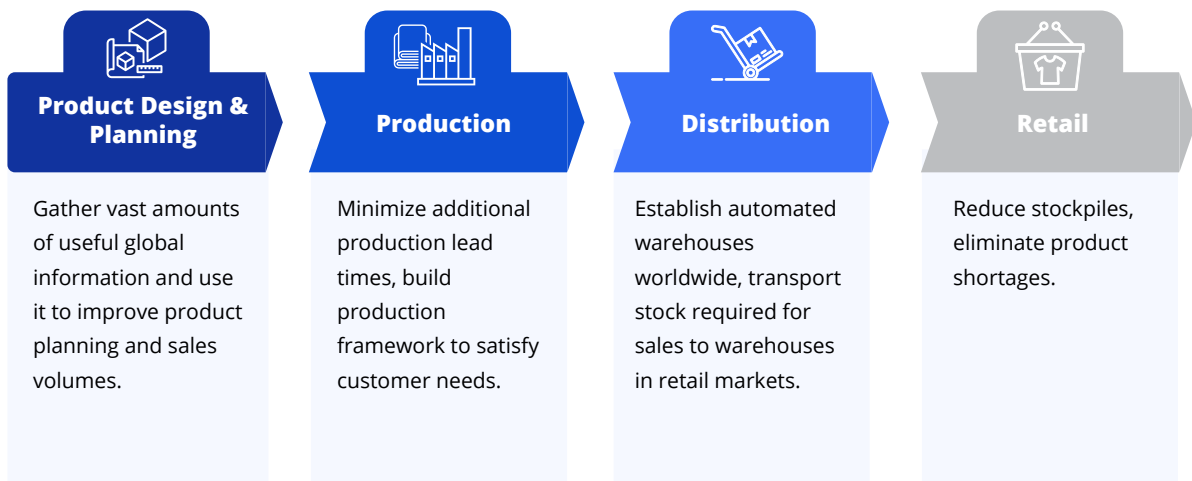
For example, Uniqlo is a brand famous for its digitalization progress. Unlike other brands that usually encourage the suppliers to adopt the digital transformation themselves, Uniqlo invented their own Supply Chain Management software called G1 (Global One) SCM system, which covers the management of the complete supply chain, starting from raw materials to delivery and inventory. Moreover, all the selected suppliers are required to adopt the G1 SCM system for better monitoring. As there is no integrated system solutions that can cover all sections in the supply chain, the G1 SCM system is undoubtedly a good demonstrator of the ideal flow of digitalization in the apparel industry.

Before the G1 SCM, the Ariake Project launched in 2017 emphasizes the integration of physical and online stores' operations to push the company to become a genuine digital consumer retail company. The output of the solution is the control of overproduction and to only sell what is necessary. With the continuous advancement in the project, the whole value chain and supply chain are closely connected and transparent. With a comprehensive integrated software system, Uniqlo undoubtedly represents one of the industry pioneers in the digital transformation journey.



*Digitalization makes demarcation of industries useless. In such a world, data is the most important source of competitiveness. As fashion and apparel products are the data itself, Amazon and Google will have a great power in this industry too. In order to overcome such challenge from these digital giants, we need to transform our supply-chain system by using digital technology <sup>7</sup>*

**Tadashi Yanai, CEO of UNIQLO**



<sup>7</sup> Harvard Business School Digital Initiative, UNIQLO: Digitalization and Supply-Chain Transformation [website], [https://digital.hbs.edu/platform-rctom/submission/uniqlo-digitalization-and-supply-chain-transformation/#\\_ftn1](https://digital.hbs.edu/platform-rctom/submission/uniqlo-digitalization-and-supply-chain-transformation/#_ftn1) (accessed 1 December 2020).

# How to improve your activity through Adoption of Digital Transformation

To start the digital transformation journey, there are several steps we would recommend the apparel industry manufacturers to consider.



## Understand the Needs

Understand the reason why we need to adopt digital transformation and the drivers of value creation. Realize the current problem with the purpose of the change.

Step  
1



## Initiative Prioritization

Identify the problems and prioritize practically. Evaluate the needs and the urgency, and make sure the solutions are all feasible for all the current hardware and software.

Step  
2



## IoT + Data Visualization

All the digitalization process in factories starts from data collection. Once the IoT system is integrated, the data for each line and process would be perfectly collected for analysis.

Step  
3



## Data Analysis and Action

After collecting the data, we can understand how to improve our targeted process and receive the recommendation from the feedback system.

Step  
4

First and foremost, it is essential to know that digital for digital's sake will not deliver results. Only when the manufacturer and the brand themselves realize the importance of digitalization will they enjoy the benefits after the journey. After the discussion between the manufacturer and the brand, they would know what KPIs they are targeting after the digitalization adoption, such as reducing cost, increasing productivity, optimizing supply chain processes, and improving operational efficiency. Therefore, understand the need for digitalization and prioritize the KPIs are the first two steps to take.

After having a general idea of the direction, the implementation of the corresponding software and hardware would be the next step. Since the system has been established, the data can be visualized with a clear dashboard, while the factory owner can thus understand the improvement point with the provided analysis and suggestions. Actions such as training, standard process check, balance check, feed support, etc. would then drive better improvement along the digital transformation process.





# Conclusion

Although the apparel industry is lagging behind other sectors, there are solutions for automation in several areas including sewing and cutting, while semi-automation has found some application in factories around the world as well. With the advancement in both hardware and software, along with the implementation of advanced technologies targeted at improving productivity, exploiting resources optimally, and reducing labor intensity, the whole industry is moving toward the stage of ecosystem's coordination in the supply chain. Currently, there are approximately 75% of the fashion brands that plan to adopt AI-infused solutions to improve supply chain flexibility.

Moving forward, more technologies will be further applied and make the integration more advanced. For instance, apply AI to the middle stage of the supply chain and the distribution process will enable a better allocation of new collections, while the IoT-enabled warehouse can be optimized with automation.

Another example of ecosystem coordination is to link with merchandising and retail business, which aims to provide customers with interactive traceability information on the top of the e-commerce business. Utilize the data and analytics throughout the supply chain to tailor the assortment in each brands' store and to streamline and optimize the sales.

More innovations are realized and applied through the digital transformation process in the apparel industry from the bottom to the top. It is also evolving toward the stage of ecosystem coordination, as professor **Yutaka Matsuo** from Tokyo University says, "Robotics integrated with deep learning should be the key technology for the society." Since digital transformation is an inevitable trend nowadays, it is suggested that the apparel manufacturing players start by identifying their current problem and make a good use of the technology to digitalize their process, to the supply chain, and toward the industry.

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Brother Machinery (Asia) Limited is located in Hong Kong, 100% owned by Brother Industries, Ltd. located in Japan. Brother Machinery (Asia) is responsible for Industrial Sewing Machine business, and Garment printer business in Asia region.

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# About Us

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YCP Solidiance is an Asia-focused strategy consulting firm with offices across 17 key Asia Pacific cities and other regions. Asia-focused with global presence, we define new business models and help clients drive their business growth through strategic solutions. We deliver high-impact advisory services by tailoring our services to suit different business needs. To learn more about our services visit: <https://ycpsolidiance.com>.

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We are present in Abu Dhabi, Amsterdam, Bangkok, Beijing, Beirut, Ho Chi Minh City, Hong Kong, Jakarta, Kuala Lumpur, Manila, New Delhi, San Diego, Shanghai, Singapore, Taipei, Tokyo and Yangon.

## What We Focus On

We focus on advising our large client base across a wide spectrum of strategic consultancy areas, identify breakthrough growth opportunities and develop execution-ready strategies and roadmaps. Our Asia-focused market entry and growth strategy services provide the required insights to capture a profitable market share in the region.

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