Il Tessile nell' Industria 4.0

Piattaforme Digitali per la Manutenzione Predittiva
e la Gestione degli Impianti

MARZOLI
Spinning solutions

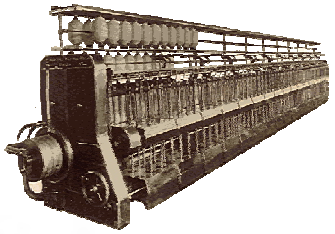


Marzoli Spinning Solutions

Overview

FOUNDATION (MARZOLI):	1851
INCORPORATED CAMOZZI GROUP :	1999
EMPLOYEES:	200
BRANCHES:	
Marzoli International (USA)	
Marzoli Textile Machinery (India)	

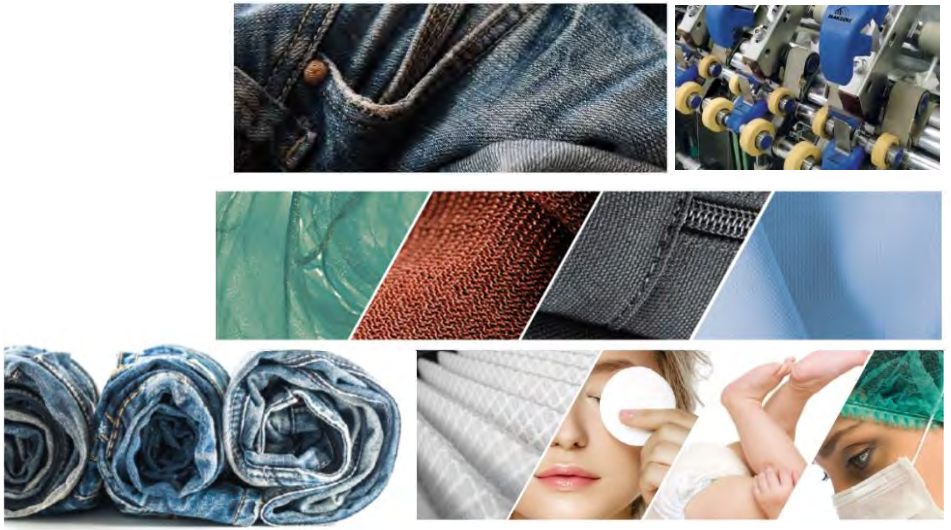
- 36 000 m²
  AREA TOTALE / *TOTAL AREA*
- +160
  ANNI DI SUCCESSI
  YEARS OF SUCCESSES
- +70
  NUMERO DI PAESI CON CLIENTI ATTIVI
  NUMBER OF COUNTRIES WITH ACTIVE CLIENTS



The only producer with full range high technology across the **complete spinning process**

Historic positioning in **Denim / Slub Yarn**

Key role in the management and maintenance of the plant played by the innovative electronic solutions and by the production management system developed by Marzoli



Camozzi Group

Overview

CAMOZZI RESEARCH

CAMOZZI AUTOMATION division

CAMOZZI

Soluzioni per l'automazione industriale

CAMOZZI MACHINE TOOLS division

INNSE BERARDI

INGERSOLL

Macchine utensili con tecnologia idrostatica e meccanica

CAMOZZI TEXTILE MACHINERY division

MARZOLI

Macchine tessili per la filatura

CAMOZZI MANUFACTURING division

MORA

Fusione ghisa, alluminio e lavorazioni meccaniche

Innse Milano

Meccanica pesante

NEWTON

Carpenteria metallica

CAMPRESS

Stampaggio ottone

PLASTIBENACO

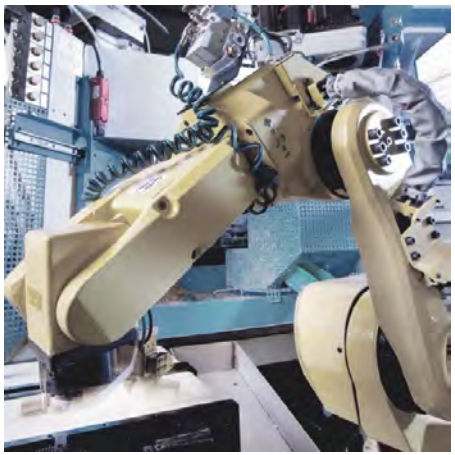
Stampaggio materie plastiche

CAMOZZI DIGITAL division

CAMOZZI DIGITAL

Innovazione digitale e soluzioni IoT per l'industria

CAMOZZI Group



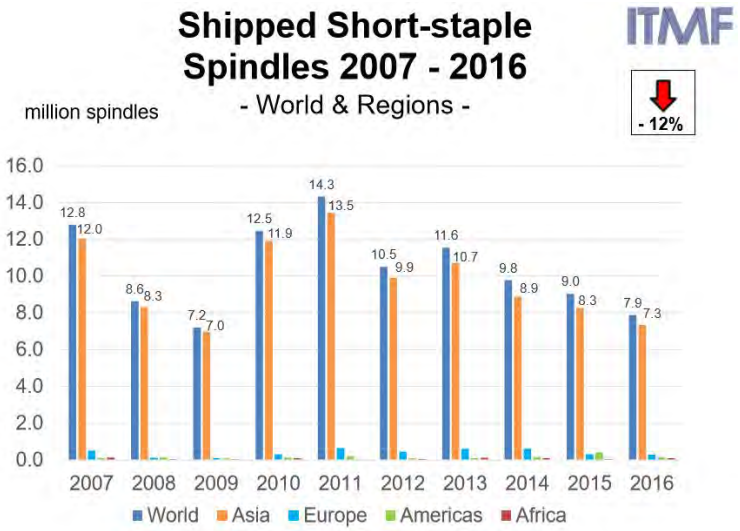
Spinning Industry

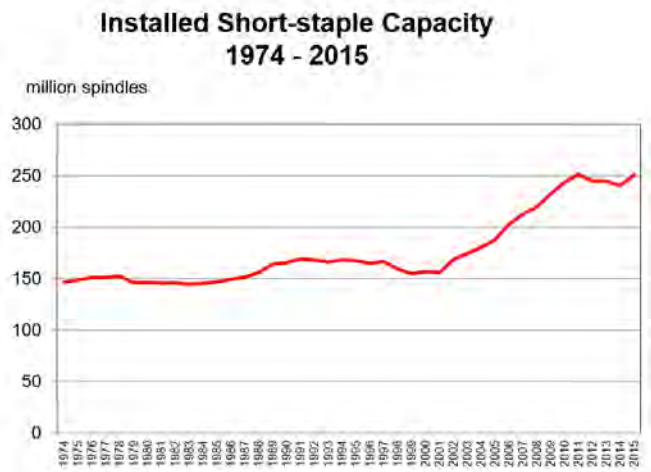
Installed Spinning Capacity – 244Ml Sp (2014)

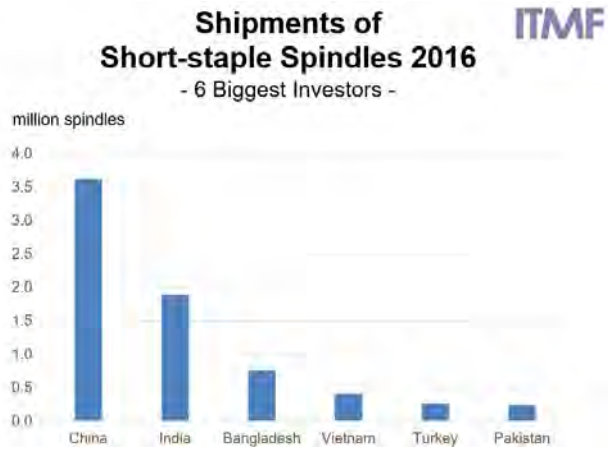
2014 Installed Spinning Capacities

	TOT	224.438.000	92%
1	China	110.000.000	45,02%
2	India	49.460.000	20,24%
3	Pakistan	11.946.000	4,89%
4	Indonesia	11.797.000	4,83%
5	Bangladesh	9.800.000	4,01%
6	Turkey	7.100.000	2,91%
7	Vietnam	5.100.000	2,09%
8	Brazil	5.070.000	2,07%
9	Thailand	3.622.000	1,48%
10	Mexico	3.540.000	1,45%
11	Iran	2.200.000	0,90%
12	Argentina	1.790.000	0,73%
13	Uzbekistan	1.700.000	0,70%
14	Korea, Rep.	1.313.000	0,54%

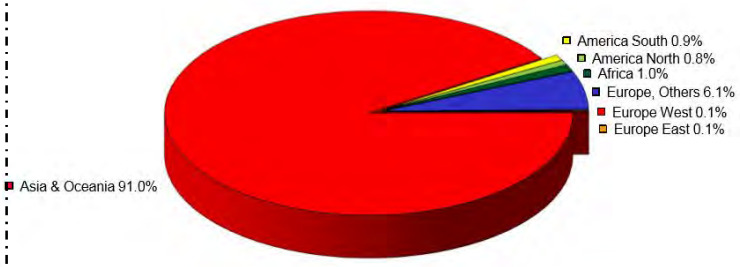
Source:ITMF Textile Machinery Shipment Statistics - 2015



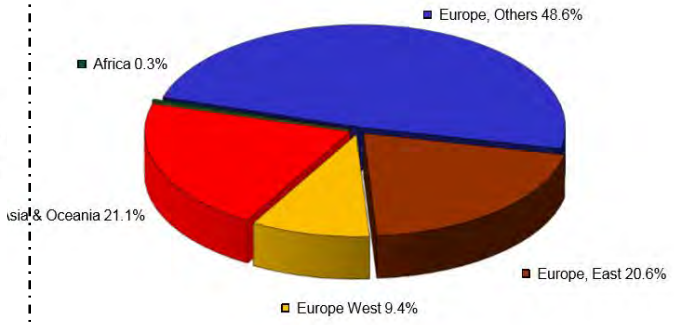




Short-Staple Spindles



Long-Staple Spindles



Spinning Industry

Continents Focus (2014)

Continent (destination)	2013 Installed Spinning Capacities			Cumulative Shipments 2005-2014			Shipments 2014		
	Spindles		O-E Rotors	Spindles		O-E Rotors	Spindles		O-E Rotors
	Short-Staple	Long-Staple (a)		Short-Staple	Long-Staple		Short-Staple	Long-Staple	
Africa	5'388'294	256'584	163'718	825'204	7'920	39'984	102'192	432	5'004
America, North	5'499'000	908'000	455'800	492'224	15'028	173'156	74'096		61'088
America, South	9'732'000	701'000	527'000	733'398	56'124	200'056	88'252		13'420
Asia & Oceania	211'524'614	6'614'552	4'905'900	103'033'900	682'746	3'115'386	8'923'856	29'008	303'888
Europe, East	3'658'784	1'294'340	1'405'740	106'236	94'674	66'540	11'376	28'368	2'600
Europe, Others	7'100'000	775'364	720'000	3'655'742	302'628	343'992	594'016	66'960	55'036
Europe, West	1'435'664	4'172'000	160'994	138'012	92'042	75'072	10'716	12'880	13'684
World	**244'338'356**	**14'721'840**	**8'339'152**	**108'984'712**	**1'251'162**	**4'014'186**	**9'804'504**	**137'648**	**454'720**
China	100'000'000		2'700'000	58'527'040	388'388	2'394'261	3'271'704	13'156	244'648
Italy	280'000	2'650'000	6'000	56'112	83'222	11'408	864	10'584	1'368

Installed Spindles **<** 10 Years Old

Global:	Italy:	China:
46 %	Short Staple **29 %** - Long Staple **3.1%**	**58.5 %**

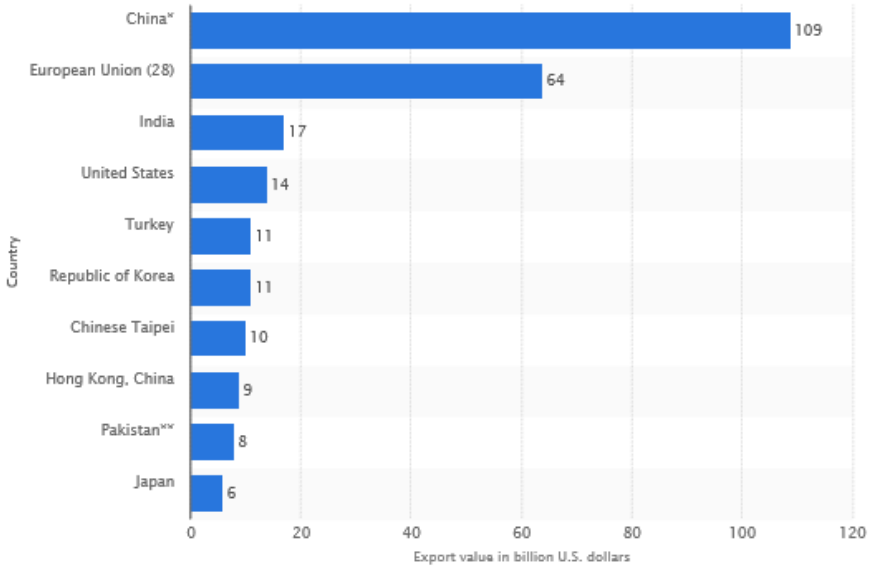
Source:ITMF Textile Machinery Shipment Statistics - 2015

Textile Industry

Facts & Figures

- The **global apparel market is valued at 3 trillion dollars, 3,000 billion**, and accounts for ***2 percent*** *of the world's Gross Domestic Product (GDP).*
- ***75% of world's fashion*** *market is concentrated in Europe, USA, China and Japan.*
- The US is the largest importer of garments in the world. **Nearly 40% of apparel** products sold in the US are imported from China
- China's textile production accounts **for nearly 54% of the world's total production.**

Value of the leading 10 textile exporters worldwide in 2015, by country (in billion U.S. dollars)



- ***Italy, Germany and the UK*** remain Europe's largest fashion markets in terms of consumption. Average spending on Fashion in the EU is about **$782 per year per capita**.
- ***In Turkey,*** textiles and apparel sector is the biggest contributor to the country's economy, exports increased from 22.9B$ in 2007 to 26.3B$ in 2016. T&C exports account for 18.5% of the general export representing over 4.8% of the country's gross GDP every year and 7% of Employee.

Source: Lit. Search

Textile Industry

Facts & Figures

Fashion-forward: When will trade re-boost Textile and Clothing?

- 2016 proved more challenging than expected for the Textile and Clothing (T&C) sector as the world economy failed to break the +3% GDP growth rate. T&C output sales decreased by -1.5%. This decline is mostly attributable to the protracted lower-than-bearable demand that resulted in a deflationist spiral. At best, T&C producer prices remained stable, as in China, but they decreased in most cases. US PPI was down -1.2% on average in 2016 while India's shed -1.8%. As a result, international trade, which accounts for a third of total T&C output, lost USD40bn worth of business.

- The outlook for 2017 is less grim. Price increases are resuming due to firmer demand prospects. T&C producer prices are forecasted to rise +0.5% in 2017 in the US and China, and by +1.5% in 2018 for the latter. As a result, exports should climb by +3.5% to USD925bn, if no major occurrence upends international trade.

- Indeed, a rise in protectionist mood and the termination of Trans-Pacific Partnership trade deal talks could land a blow to the T&C sector. Tariffs and regulations are already high and pinpointed as impeding sector growth.

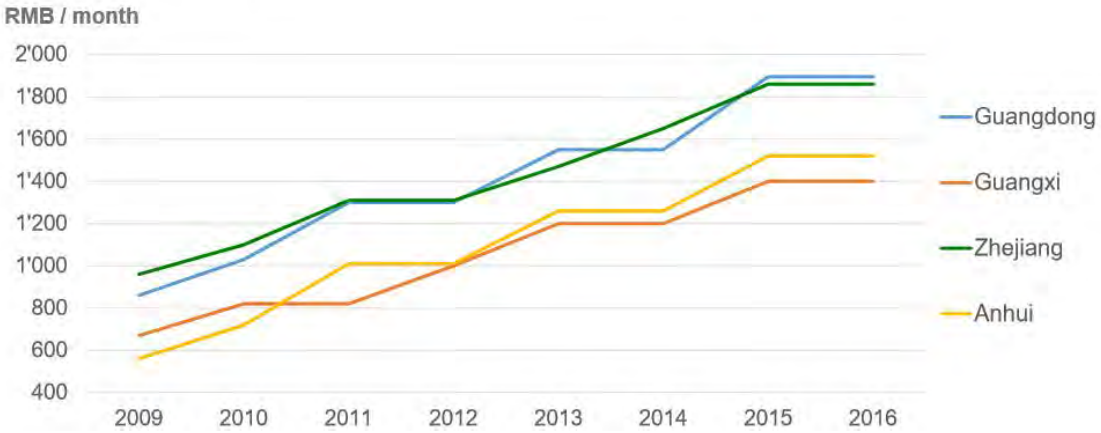
EULER HERMES
Our knowledge serving your success

Textile Industry

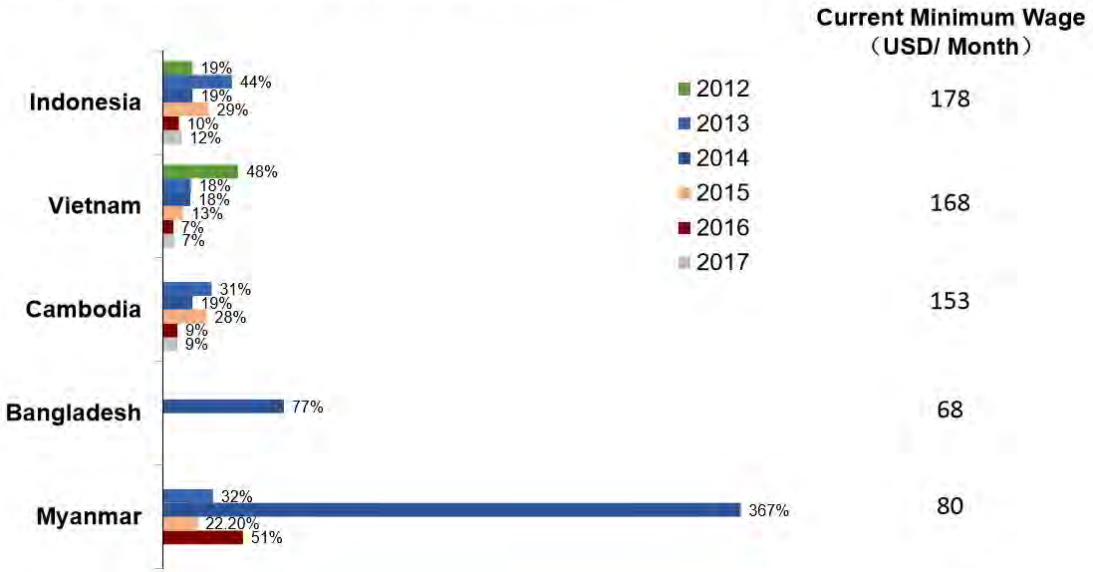
T&C Trends

Rising Wages in China

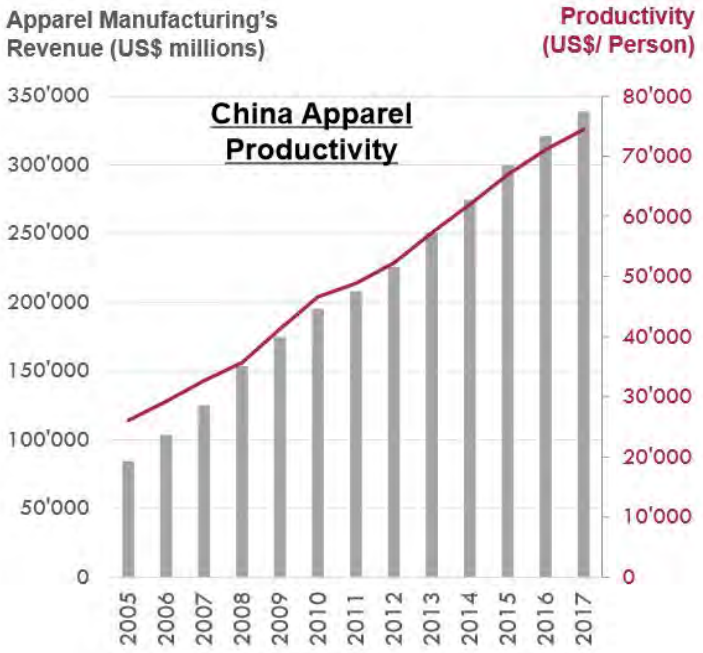
Minimum wages



Wage Increases in other Asian Countries



Source:www.mohrss.gov.cn



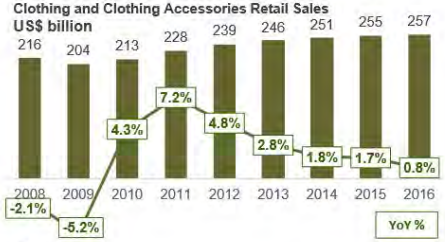
Textile Industry

T&C Trends

Slowing Down Retail Sales

US

Clothing and Clothing Accessories Retail Sales
US$ billion



EU

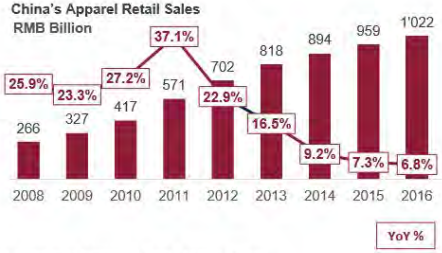
Textile, Clothing, Footwear and Leather Goods Retail Index
(2010=100)

Japan

Fabric Apparel & Acc.
(YEN bn)

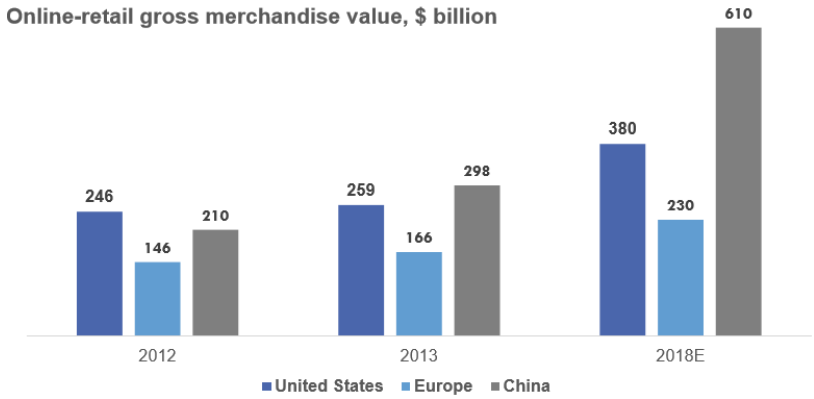
China

China's Apparel Retail Sales
RMB Billion



Source: US Census Bureau; Eurostat; Japan Ministry of Economy, Trade and Industry; National Bureau of Statistics of China

Fast Growing E-Commerce Market



Source: http://www.mckinsey.com/industries/retail/our-insights/five-keys-to-connecting-with-chinas-wired-consumers

Disrupting Traditional Brick-and-Mortar Retail Model

68 stores shut down in early 2017

30 UK stores will be closed & 45 will be converting to food-only in 5 years

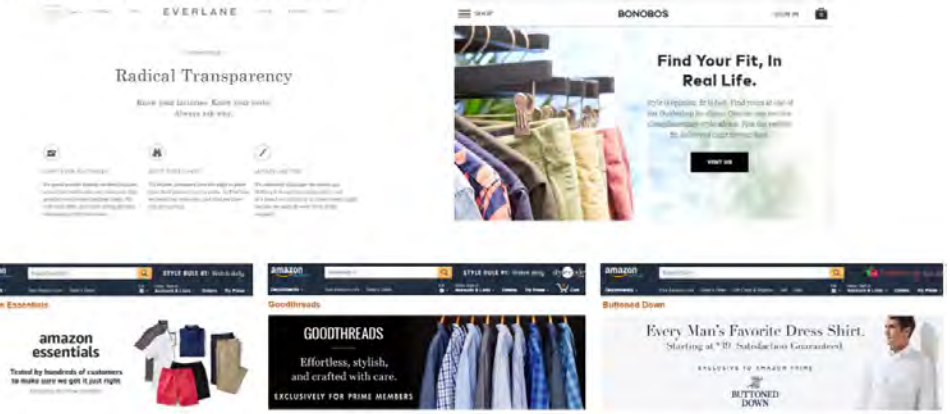
90 stores closed in 2012 – 2016
Anticipating store closures in 2017

150 stores to close in early 2017

All 110 US stores to close in April 2017

All 250 stores are closing

New e-Business Apparel Brands

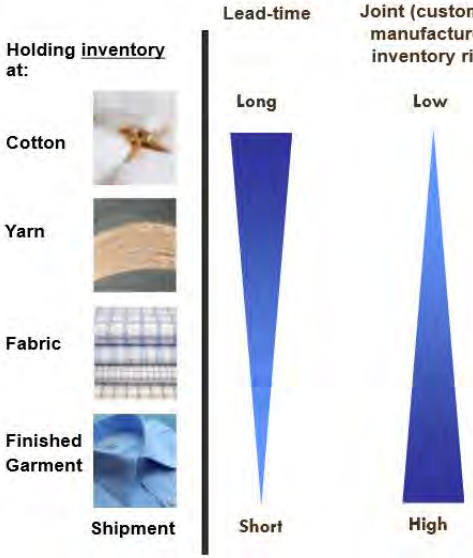


Textile Industry

T&C Trends

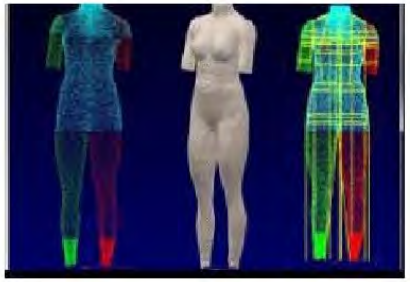
Improve Responsiveness

Building appropriate inventories & streamlining process



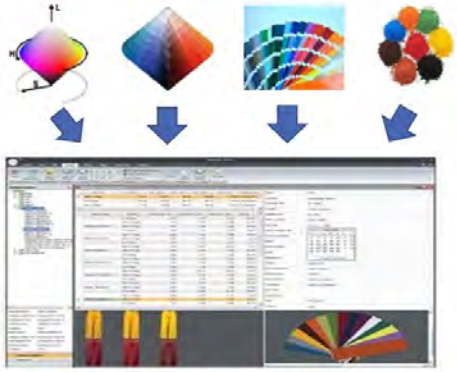
Technology Exploration & Application

Virtual Sampling



Technology Exploration & Application

Digitalization



Computerized Dyeing Recipe Optimization

Digital Printing

Robotics

Automation

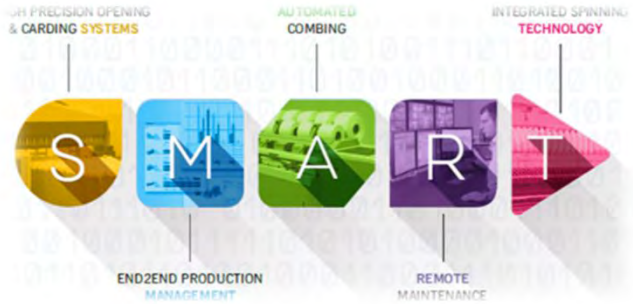
Increase Forecast Accuracy for Better Planning & Reduce Rework

POS sharing

Drone

Cuff Stitching and Trimming Unit

Button Holing Indexer



Marzoli

Smart Solutions for Spinning Mills

The Platform

Integrated Smart Factory

MILL FLEXIBILITY

PROACTIVE MAINTENANCE

ENERGY SAVINGS

BOOST PRODUCTIVITY

CLOUD

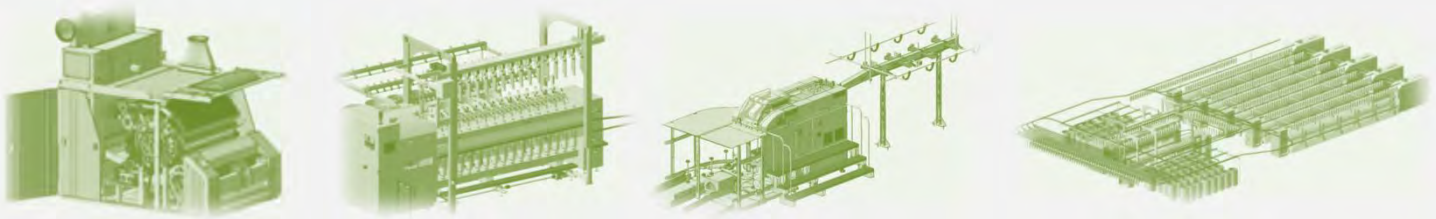
MRM

ERP

WorkShop

YARNET

Agent



Marzoli Remote Maintenance

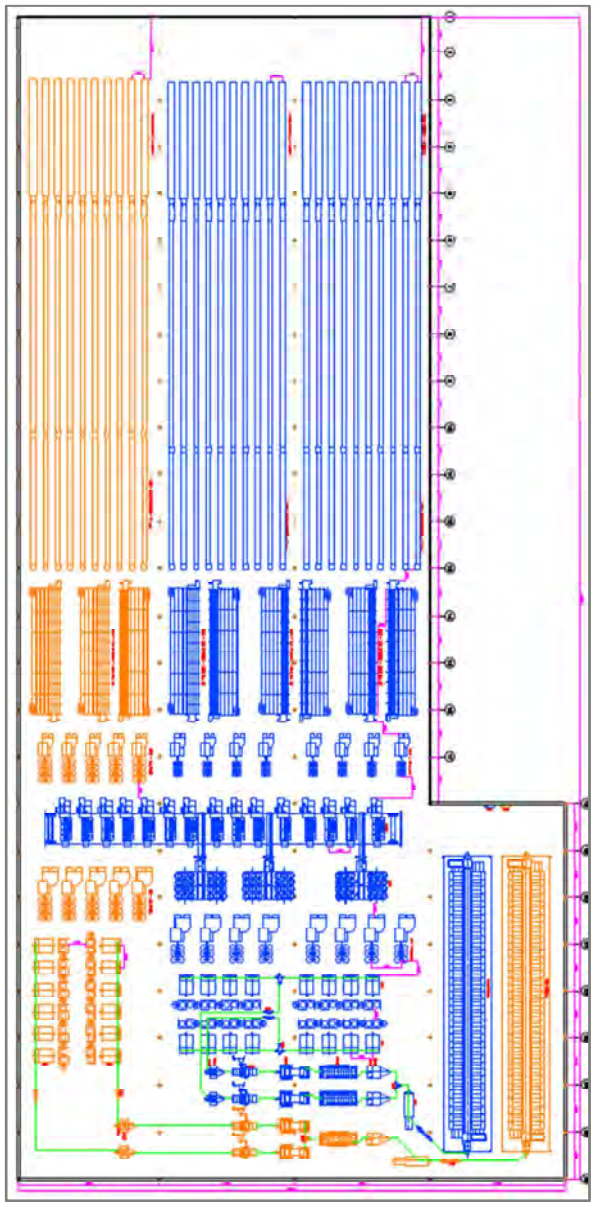
IoT Platform by Microsoft

YARNET

Marzoli Production Management

Marzoli Remote Maintenance

Maintenance in the Spinning Mill



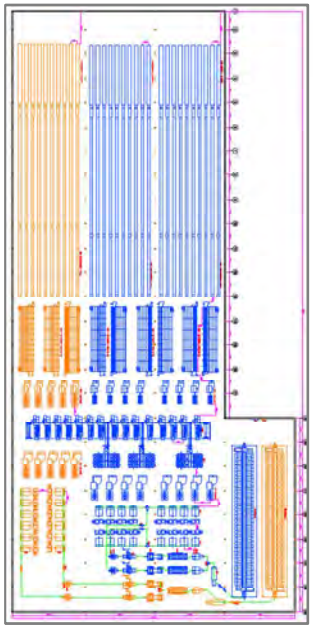
Spinning Plants & Main Costs

- *Raw Material* *57.1%*
- *Fuel & Power* *14.4%*
- *HR* *11.0%*
- *Spares & Maintenance* *9.5%*
- *Financing Cost* *4.9%*
- *General Costs* *1.8%*
- *…*

Maximize **Machineries & Components Life-Time**
Maximize **Overall Equipment Effectiveness**
Minimize **Total Cost of Ownership**
Minimize **Energy Consumption**

Marzoli Remote Maintenance

Maintenance in the Spinning Mill



- **54.000 Spindles** - Spinning Mill
- Line for: **Carded Cotton** and **Combed Cotton**
- **139 Machines**
  (30 x Ringframe, 9 x Rovingframe, 9 x Random Bobbins Transport System, 26 x Drawframe, 15 x Combing Machines, 28 x Carding Machines, 22 x Opening Machines)
- **43.000 kg** Yarn / Day
- Covered Area: **18.400 m²**
- 24h / 7 - **8.000 year working hours**

Spinning Plant - Numbers of Maintenance

300.000 Bearings
1.250 Electric Motors
3.500 Toothed belt/ Flat Belt
750 Servo Drive + Inverter

4.500 kW – Total Installed Power

MDS1 RingFrame
The Numbers of Maintenance

8.400 Rotating Parts
9.040 Bearings
17 Electric Motors
37 Toothed belt/ Flat Belt
90kW – Installed Power
6 Servo Drive + 2 Inverter

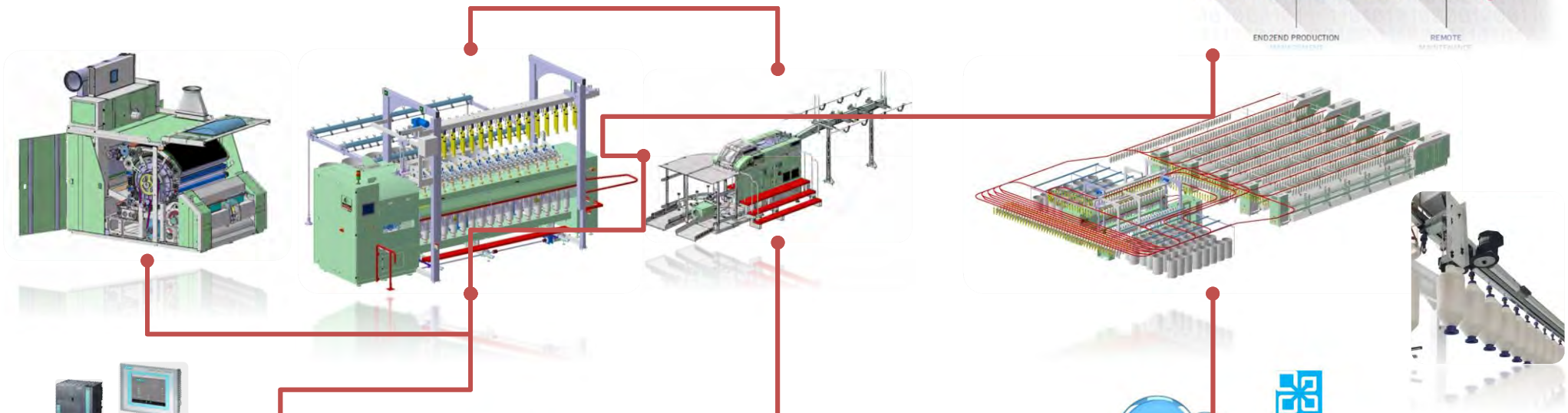
x 30 MDS1

271.000 Bearings
510 Electric Motors
1.100 Toothed belt/ Flat Belt

2.700kW – Ringframe Installed Power

Inspection, check, patrolling, regreasing, replacement, repairing...
...Up to 15.000 Maintenance / Hours

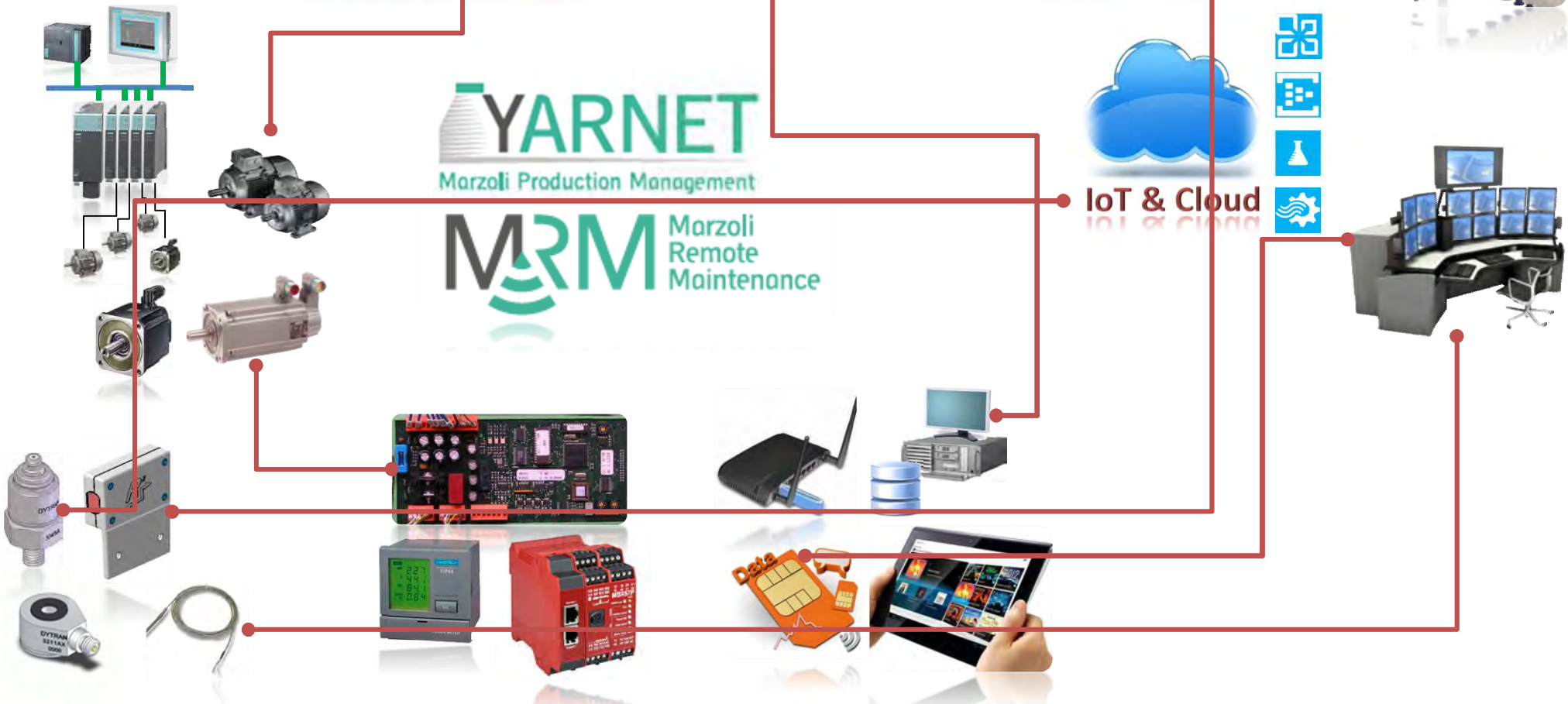
The Ecosystem & Cyber-Physical Systems



YARNET
Marzoli Production Management

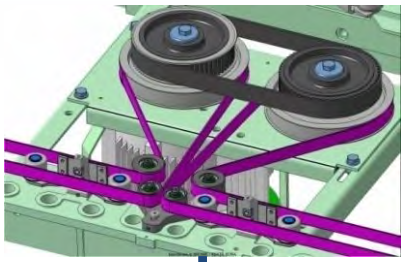
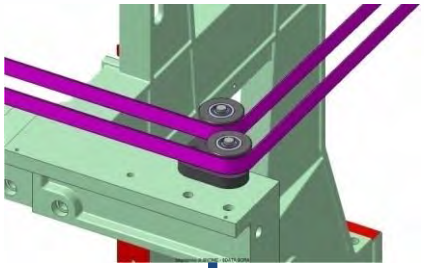
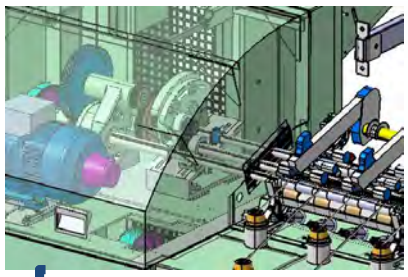
MRM Marzoli Remote Maintenance

IoT & Cloud



The Platform

Condition Monitoring

Local – Storage





Real Time




- ❑ Velocity of Motors and Mechanical Drives
- ❑ Gearings/BearingsTemperature
- ❑ Vibrations
- ❑ Machines PLC Alarms
- ❑ Motors Current
- ❑ Motors/Machines Power Consumption
- ❑ Temperature of Electrical Cabinets
- ❑ Temperature of ServoDrives & Inverters
- ❑ Temperature of Motors
- ❑ Machines Logical Status
- ❑ Compressed Air Pressure
- ❑ Oil Level / Temperature

The Platform

Condition Monitoring

Spinning Mill

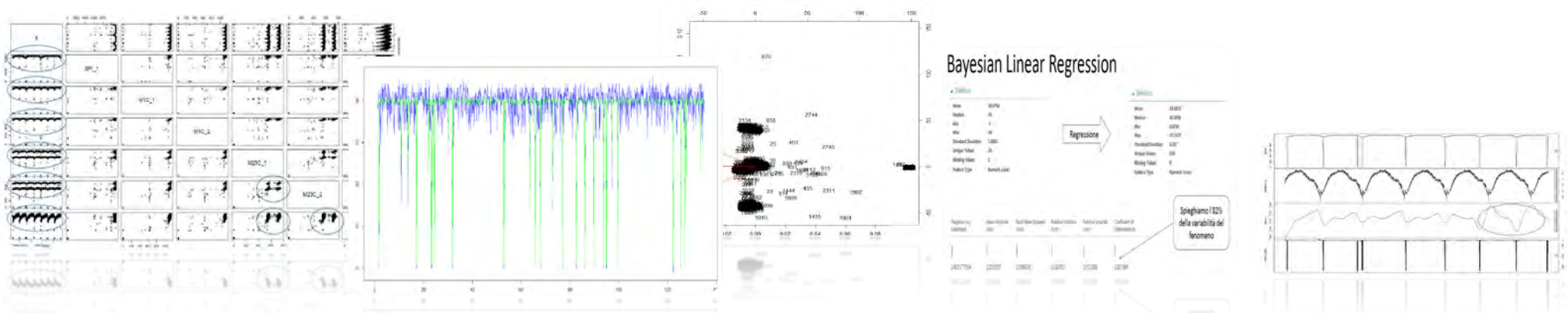
- Accessible ***anywhere***
- ***Multi Device*** - Application
- (Close to) ***Real Time***
- Reliable access (Security Access, Data Consistency)
- ***Extended*** Computational and Storage ***Capacity***
- ***Standard*** IoT Platform

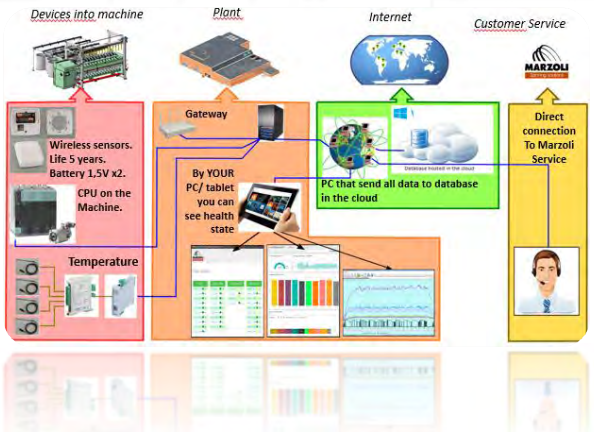
Marzoli Control Room

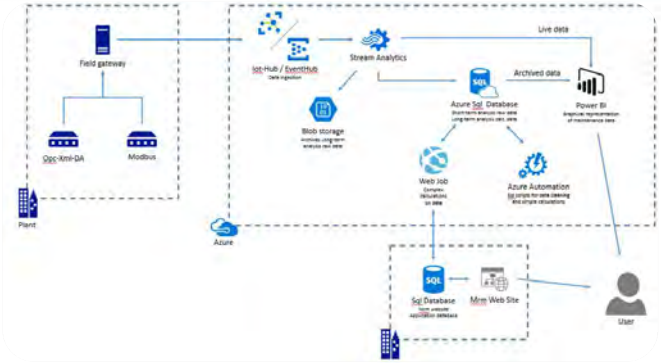
The IOT Platform, ML & Pattern Detection

Inside the Data

- Raw Data / Big Data
- Advanced Analytics & Digital Twins
- Pattern recognition, Drift Phenomena, Statistical phenomena detection, Performance Measurements
- Cloud Architecture
- Gateway & Field Agent
- Digital Legal





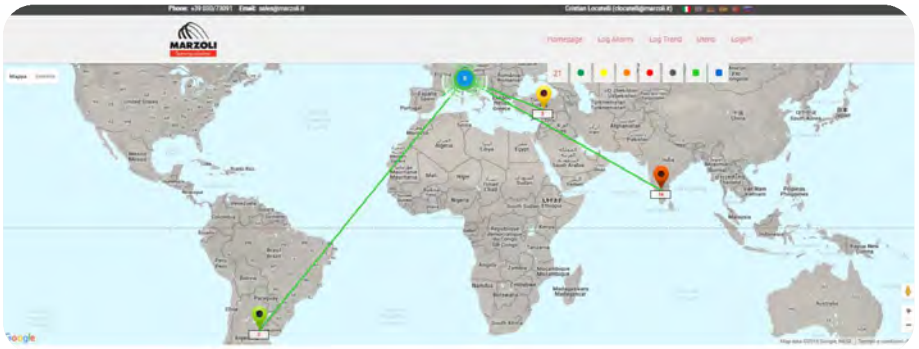


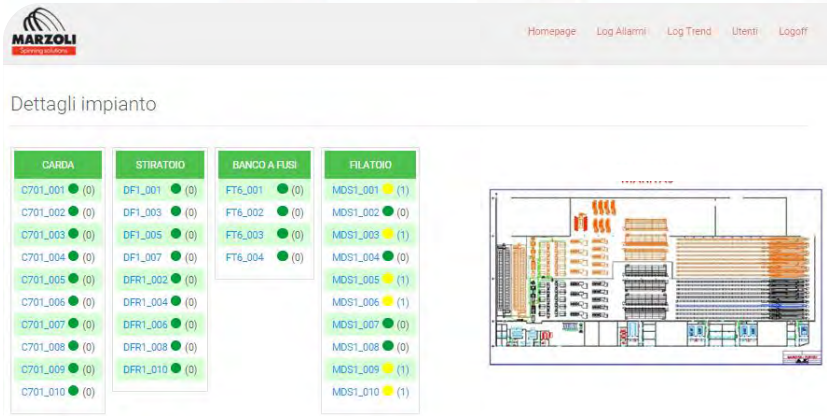
CD SW AGENT

- ❑ **STORE & FW**
- ❑ **EVENT HUB/IOT HUB**
- ❑ **FIELD DRIVERS**
- ❑ **BACK UP& RESTORE**
- ❑ **SW UPGRADE**
- ❑ **VPN CONNECTIONS**
- ❑ **REMOTE CONTROL**

The Platform

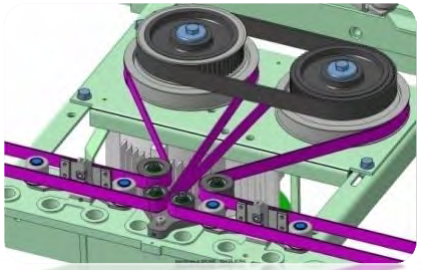
MRM, Graphical User Interface

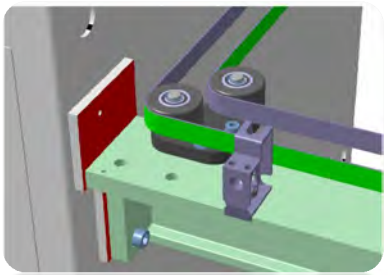


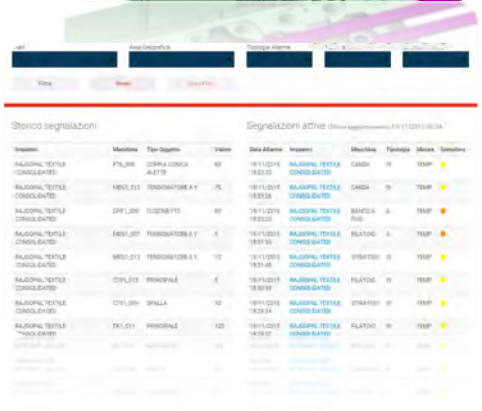


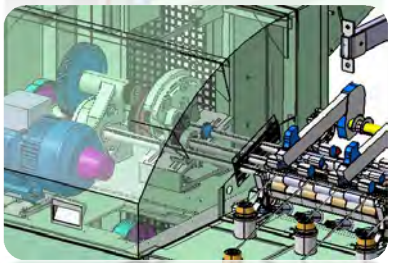
Predictive Maintenance

- Preventive Maintenance
- Reduction of Time for Problems Setting, Problems Analysis and Solving.
- Remote Assistance
- Marzoli Control Room: dedicated senior technical team
- Optimization of Machinery Parameters
- Remote Upgrade of Machinery SW
- Secure Access





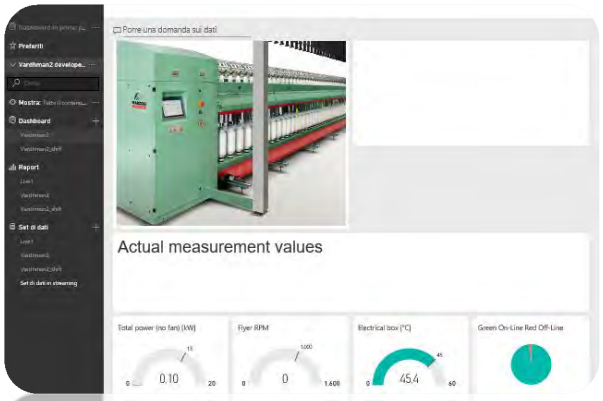


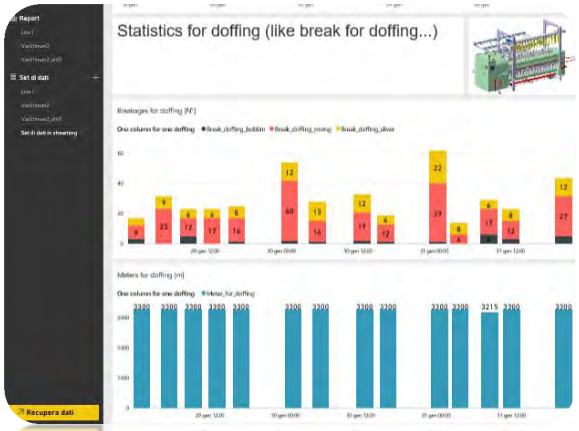


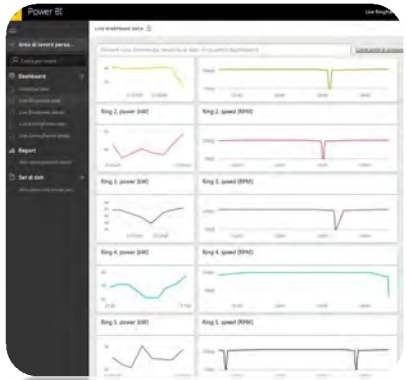
The Platform

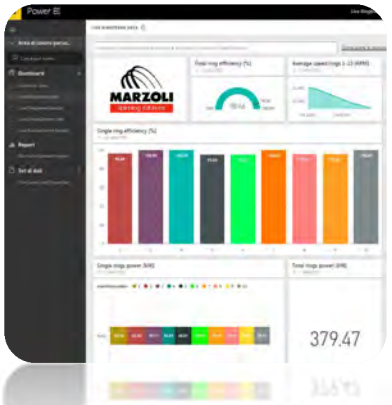
DashBoards & KPI

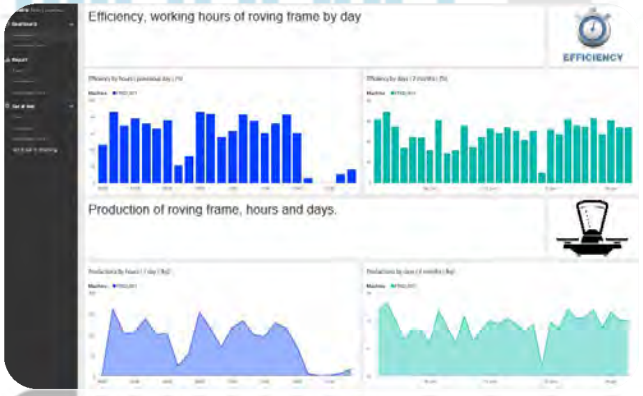
- Snapshot of the status of the entire plant
- Accurate and easy to use productions collector
- Fast and Smart management of Production Recipes
- PMS integrated with spinning production data
- High Integration with Marzoli's Machines & Products
- Thorough analysis for higher Productivity & Efficiency

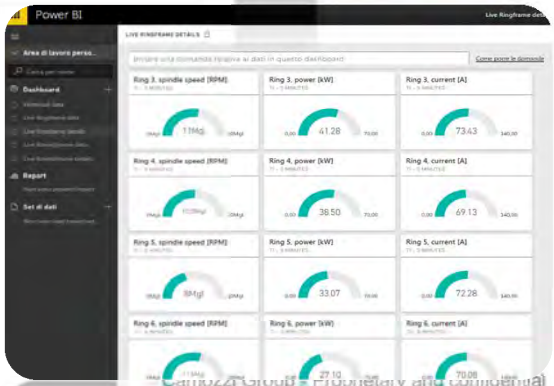












Benefits

The Innovative Maintenance platform for the Textile Industry

- Increased productivity,
- Reduction of machines unplanned downtimes,
- Prevention from major machine failures,
- Longer plant lifespan,
- Higher efficiency,
- Complete reliability,
- Trouble free spinning experience,
- Better maintenance planning.
- Power Savings
- Continuous & trasparent Monitoring of Maintenance Costs

- *15 % Reduction of Total Hours for Maintenance (1.500 Hours / year)*
- *2 % Reduction Power Consumption (480.000 kW / Year)*
- *1 % Increase Plant Efficiency (75.000 kg/ Year)*
- *15 % Increase Service Life of Electronic Devices*
- *10 % Increase Service Life of Electric Motors*
- *10 % Increase Service Life of Bearings*

Thanks to Marzoli Remote Maintenance, the client can draw on a great, relevant and reliable amount of information in order to effectively undertake maintenance operations, reduce operating costs and always obtain the highest machinery performances.

Digital Innovation and IoT Solutions for Industry

What makes, the offering of the Camozzi Group unique is its ability to synchronize experience and know-how in a universal way throughout each of its companies. This means combining industrial, managerial and technical knowledge.

Within these sectors we have the ***domain competences*** and expertise able to transform Big Data into ***Big Added Value***

CAMOZZI DIGITAL

Thank you for your attention

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