

Revolutionary. Also our technologies.



**Data of IG production – valuable
information for process monitoring,
optimization and product quality
control**

Bystronic Lenhardt GmbH

Klaus Puschmann

21.09.2016

Agenda



Because we care

- Introduction of Bystronic glass
- Data exploration in the machinery industry
- Bystronic glass 4.0
- Outlook

Bystronic glass strategic business units



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Insulating glass manufacturing



Handling equipment



Automotive glass pre-processing

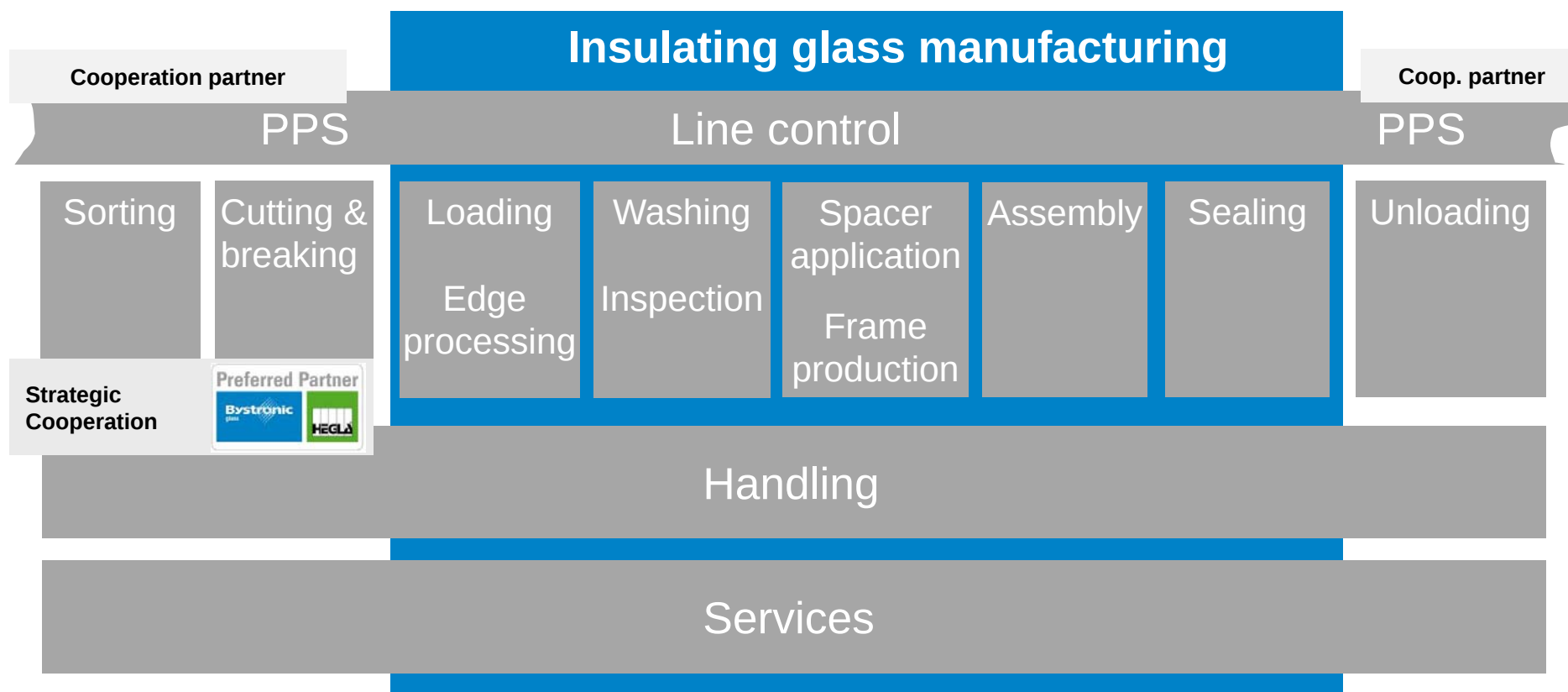


Service

Innovative solutions for productive processing of architectural glass



Because we care



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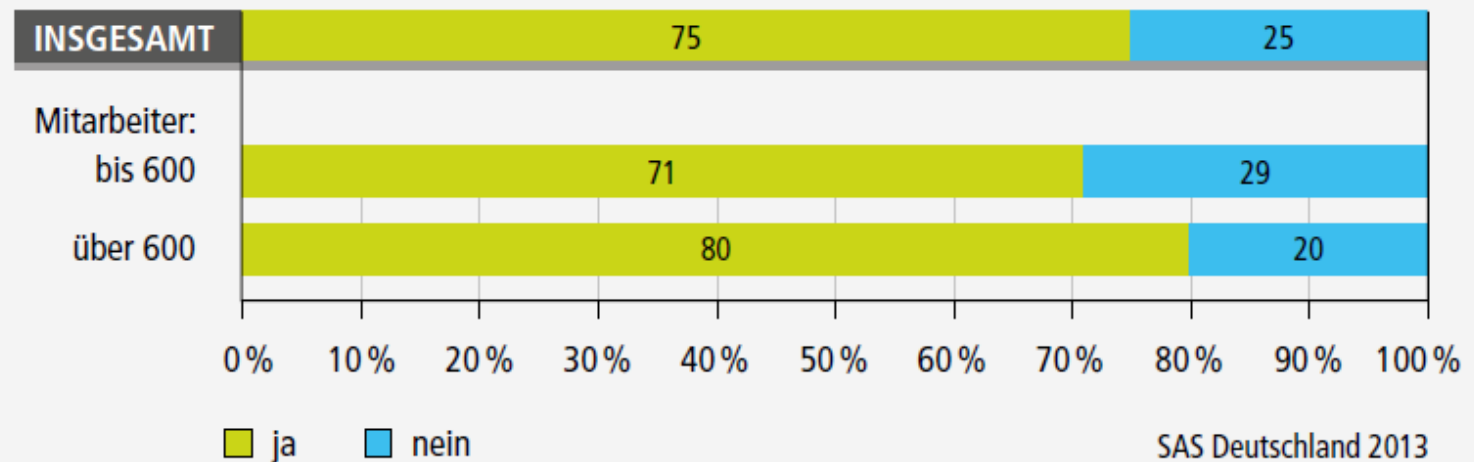
Data exploration in the industry



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Auswertung von Maschinendaten

Es nutzen im Unternehmen die Möglichkeit, Maschinen- oder Sensordaten bzw. Servicedaten auszuwerten



SAS Deutschland 2013

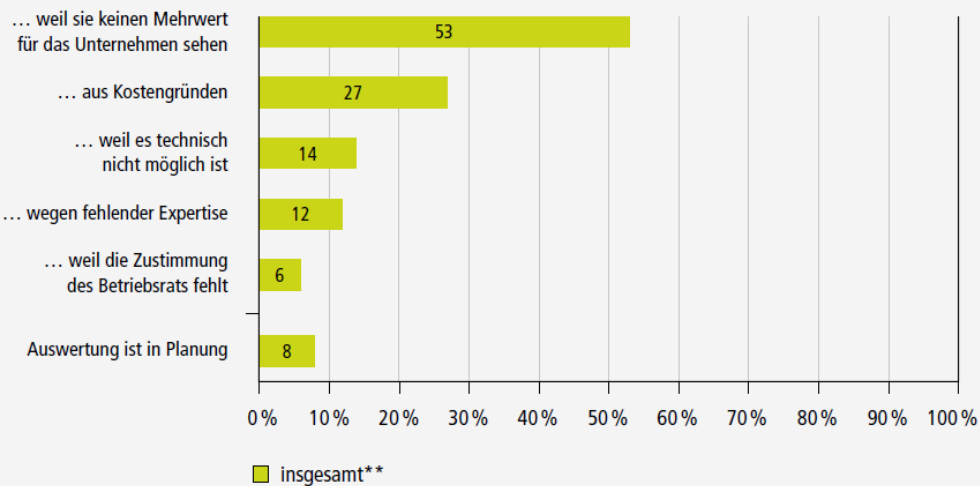
Why is the situation like this?



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Gründe gegen die Auswertung von Maschinendaten*

Es werten die Maschinendaten nicht aus...



* Basis: Unternehmen, die Maschinendaten derzeit nicht auswerten

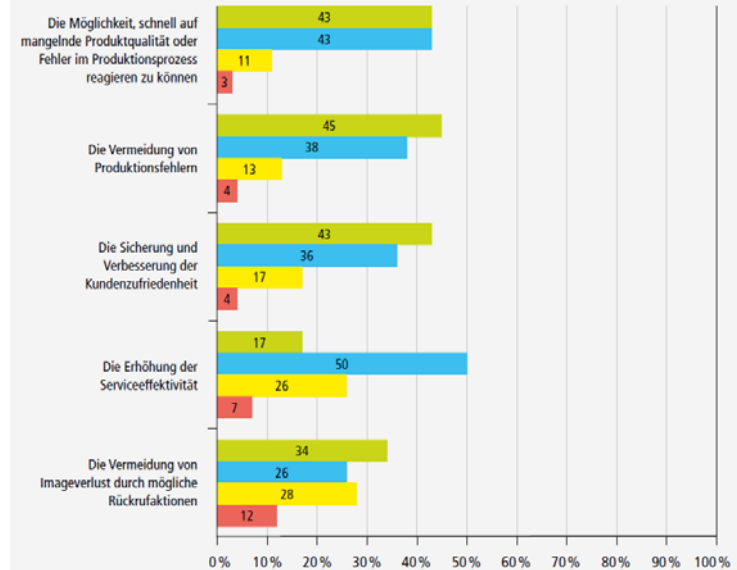
** Prozentsumme größer 100, da Mehrfachnennungen möglich

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Gründe für die Auswertung von Maschinendaten I*

Bei der Auswertung von Maschinendaten spielt eine:

■ sehr große Rolle ■ große Rolle ■ weniger große Rolle ■ keine Rolle



* Basis: Unternehmen, die Maschinendaten auswerten

SAS Deutschland 2013

Economic potential of data exploration



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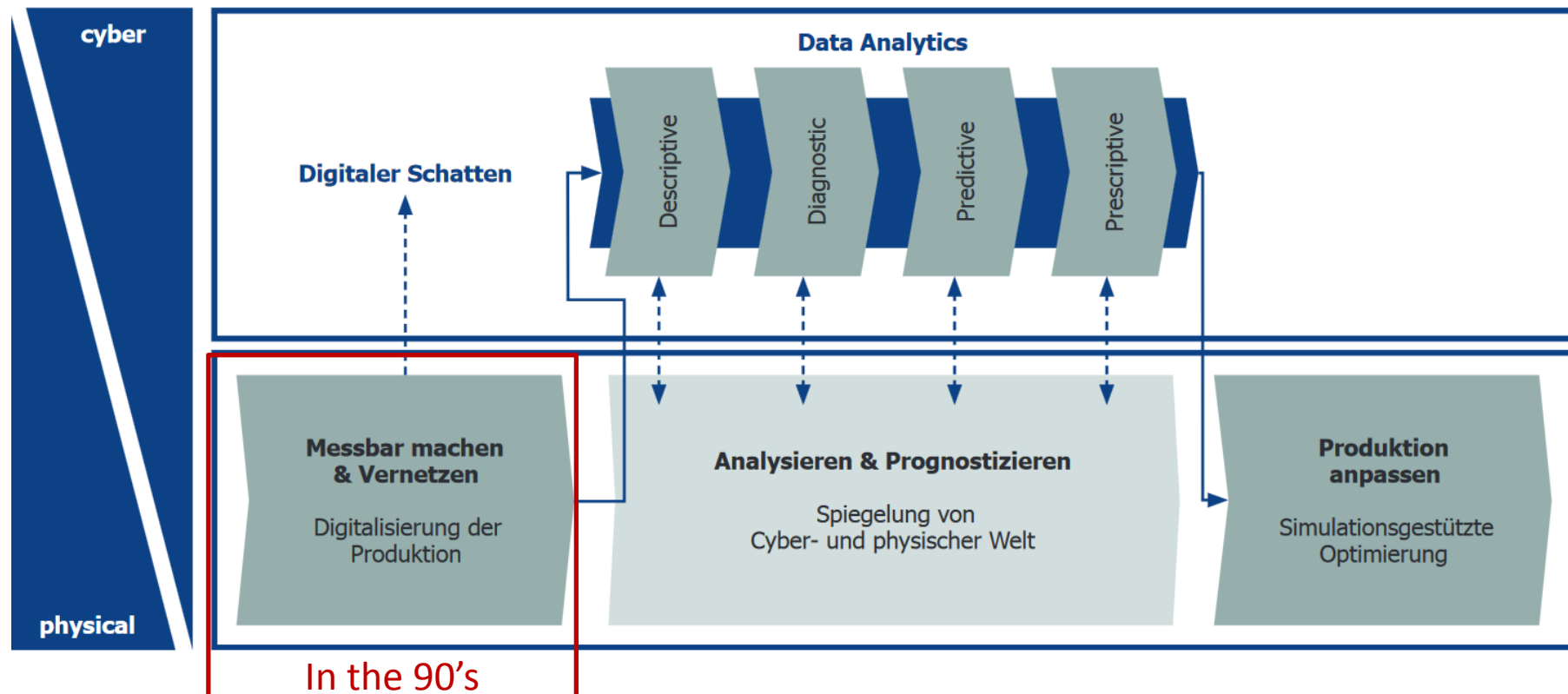
Kosten	Effekte	Potenziale
Bestandskosten	■ Reduzierung Sicherheitsbestände ■ Vermeidung Bullwhip- und Burbridge-Effekt	-30 bis -40 %
Fertigungskosten	■ Verbesserung OEE ■ Prozessregelkreise ■ Verbesserung vertikaler und horizontaler Personalflexibilität ■ Einsatz von Smart Wearables	-10 bis -30 %
Logistikkosten	■ Erhöhung Automatisierungsgrad (milk run, picking, ...) ■ Smart Wearables	-10 bis -30 %
Komplexitätskosten	■ Erweiterung Leistungsspannen ■ Reduktion trouble shooting ■ Prosumer Model	-60 bis -70 %
Qualitätskosten	■ Everything as a Service (XaaS) ■ Echtzeitnahe Qualitätsregelkreise	-10 bis -20 %
Instandhaltungskosten	■ Optimierung Lagerbestände Ersatzteile ■ Zustandsorientierte Wartung (Prozessdaten, Messdaten) ■ Dynamische Priorisierungen	-20 bis -30 %

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Levels of data exploration



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BYSTRONIC

CIP Verbund-Produktionskonzept für die auftragsbezogene TPS-Isolierglas-Fertigung
CIP combined production for order driven TPS insulating glass manufacturing

LENHARDT



CNC Formenschneidmaschine SMFR
CNC shape cutting machine SMFR



Brechsystem mit BYSHOW Schneidplananzeige
Breaking system with BYSHOW cutting plan display



Sortiersystem mit Fächerwagen
Sorting system with storage wagons



TPS-Linie
TPS-line



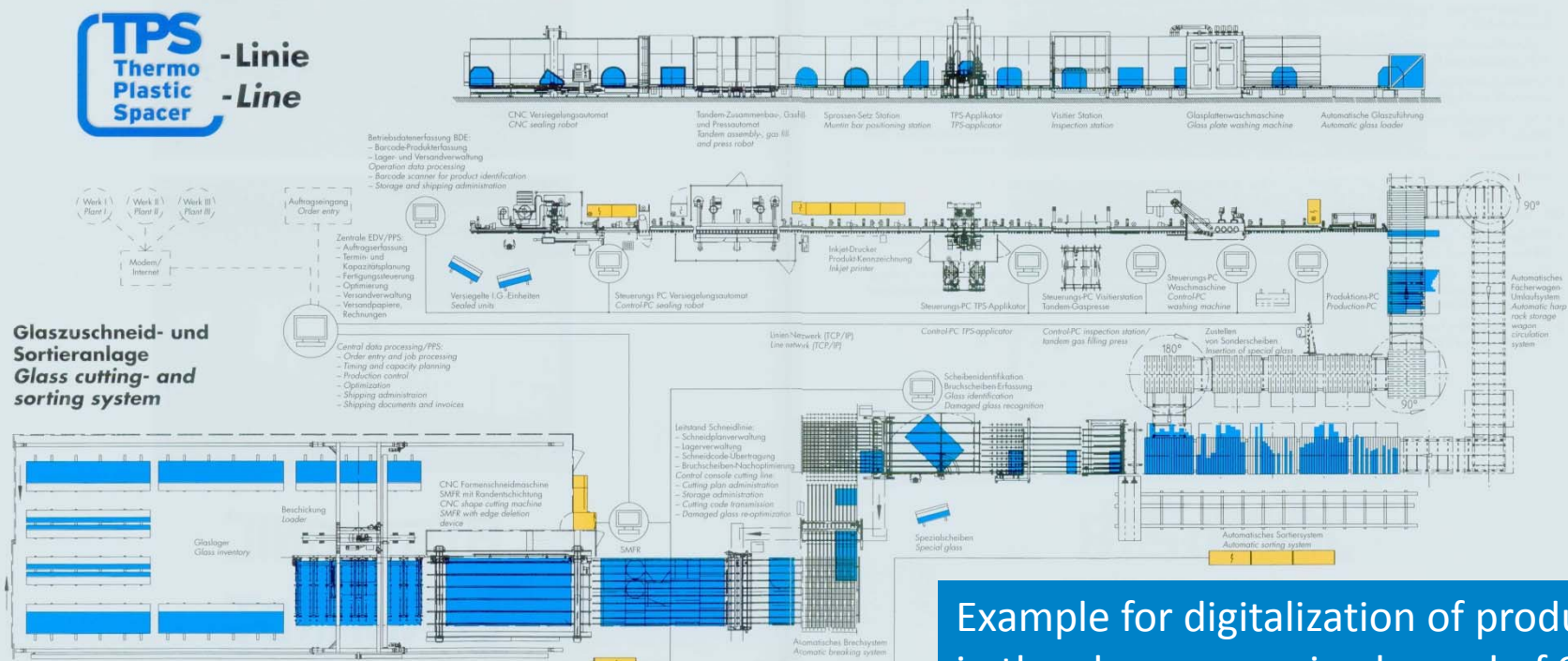
TPS-Applikator zur Direktapplikation des thermo-plastischen Randverbunds
TPS-applicator for direct application of thermo-plastic spacer



CNC-Versiegelungsautomat für Rechteck- und Modell-Formate
CNC sealing robot for rectangular and shaped insulating glass units

TPS
Thermo
Plastic
Spacer
- Linie
- Line

**Glaszuschneid- und
Sortieranlage
Glass cutting- and
sorting system**



Example for digitalization of production
in the glass processing by end of 90's

Agenda



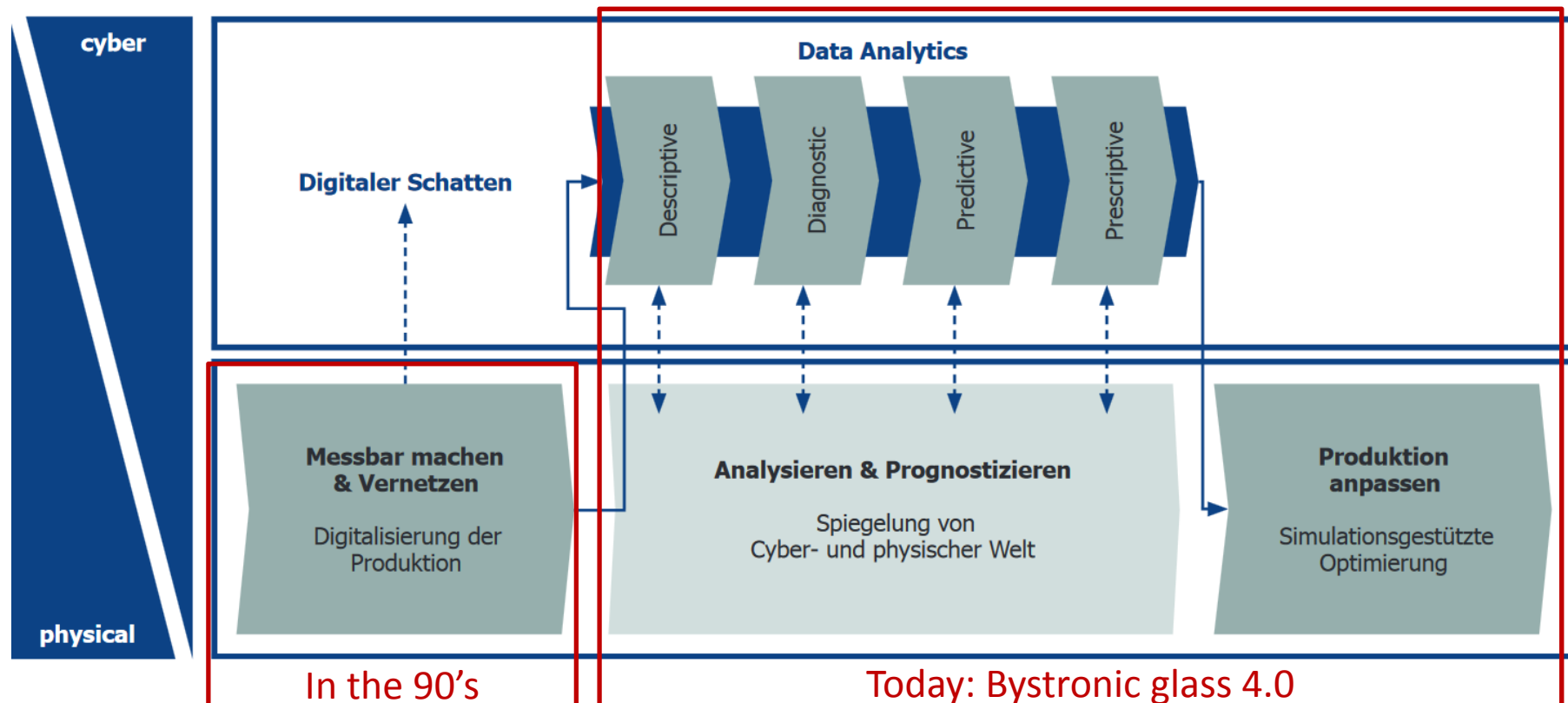
Because we care

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- **Bystronic glass 4.0**
- Outlook

Levels of data exploration



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Bystronic glass 4.0



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Four Elements of Bystronic glass 4.0



Because we care

› Predictive Maintenance

Be informed in time to plan maintenance when needed

› Process Optimization

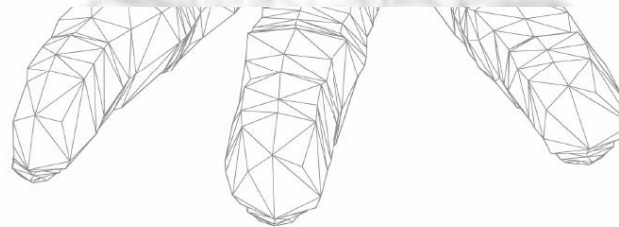
Optimization of the grinding process by measuring and evaluating the active current of the spindle

› Production Efficiency

Combine machine and production data to increase Overall Equipment Effectiveness (OEE)

› Production Interaction

Be connected between IGU Production and Window Glazing

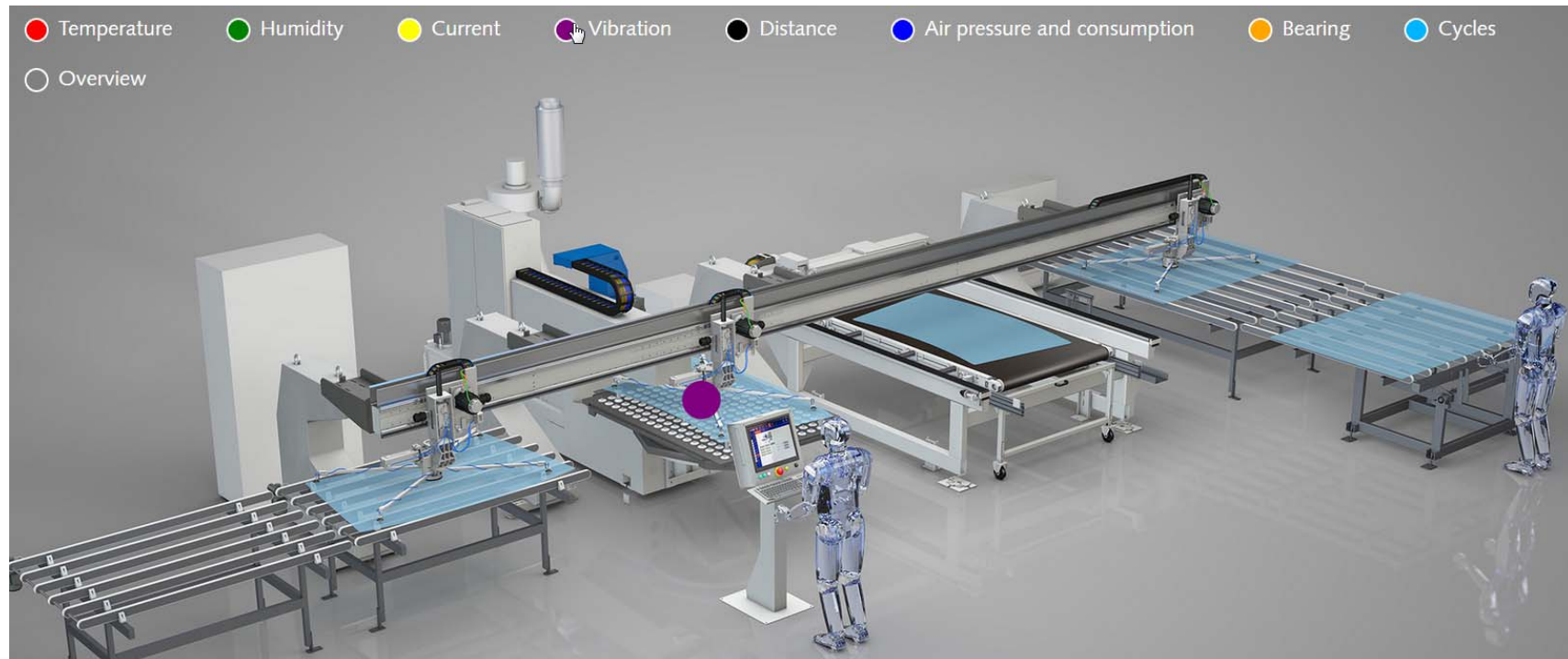


Predictive Maintenance

Be informed in time to plan maintenance when needed



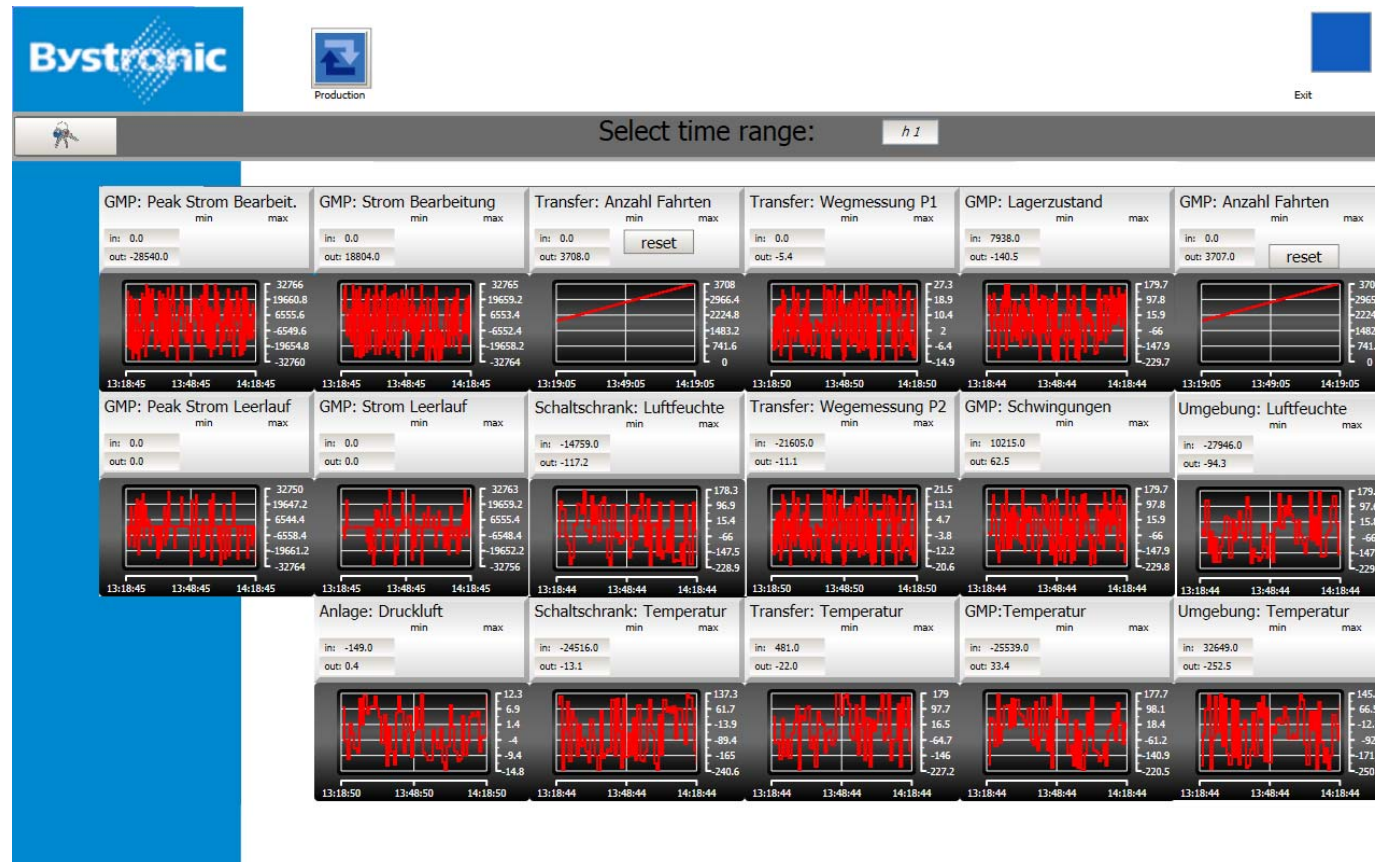
Because we care



Predictive Maintenance



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Process Optimization



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The current of the grinding spindle is measured during grinding and used to

› Correct the alignment of the part on the table of the grinder

› Detect defects of the ground part, e.g. chips

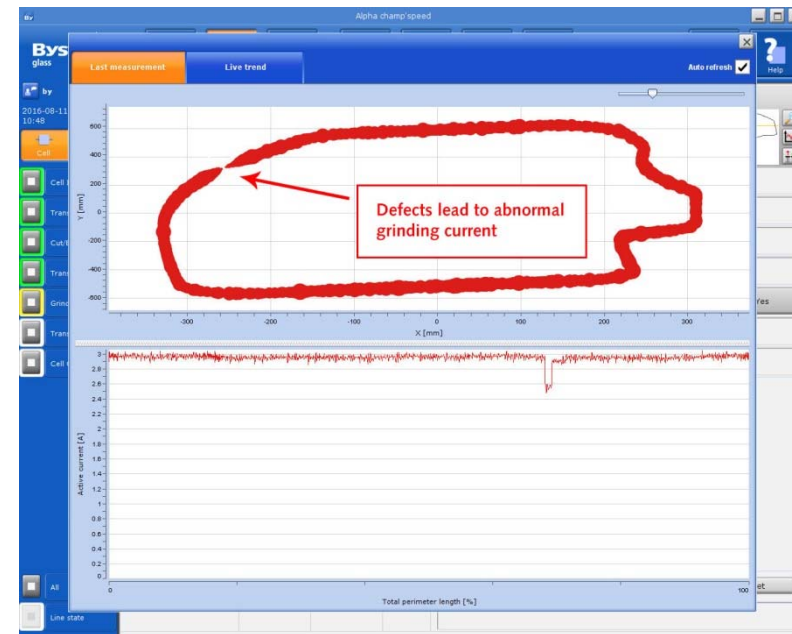
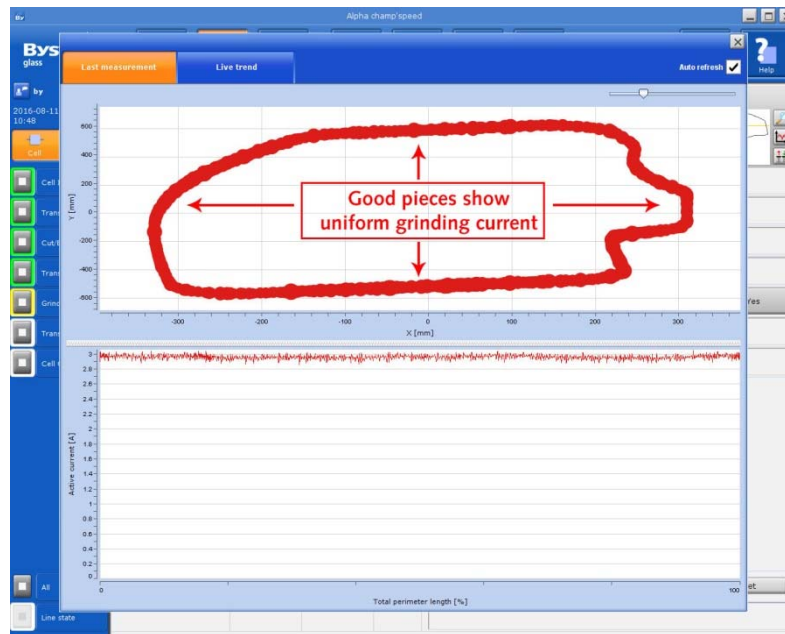
› Determine the right moment to redress the grinding wheel

Process Optimization

Optimization of the grinding process by measuring and evaluating the active current of the spindle



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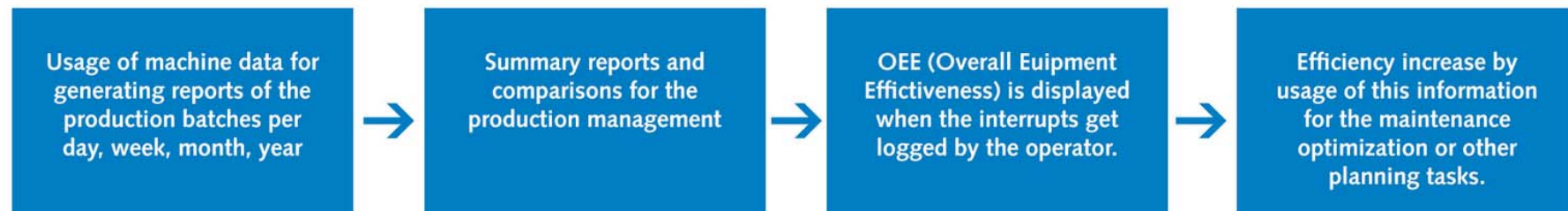
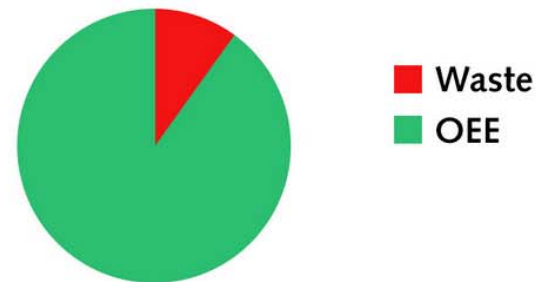


Production Efficiency

Combine machine and production data to increase Overall Equipment Effectiveness OEE



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Information everywhere



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Machine Terminal



Web based Application



App for mobile devices



Production Interaction

Bystronic
glass

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Accurate,
reliable and
gentle IGU
palletizing by
robot

Position and
sequence of IGU
packaging is
requested by the
automated
window glazing



Seamless
**PRODUCTION
INTERACTION**
without manual glass
handling and without
time-consuming glass
buffering

The glazing robot
removes the IGU in
the reverse sequence
directly from the
transport rack.



Production Interaction

Be connected between IGU production and Window glazing



Bystronic glass

Supplier of solutions
for IGU-offloading



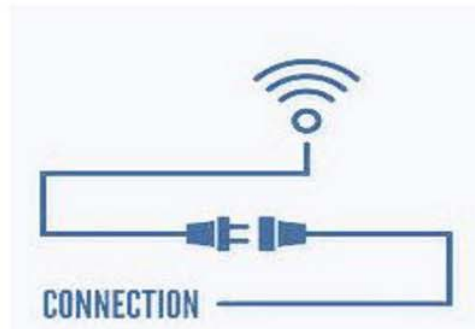
IGU
Manufacturer



Robotic
palletizing

A & W

Company scanning Software
for rack optimization



Tecauma

Supplier of solutions
for Window glazing



Window
Manufacturer



Robotic
depalletizing

Agenda



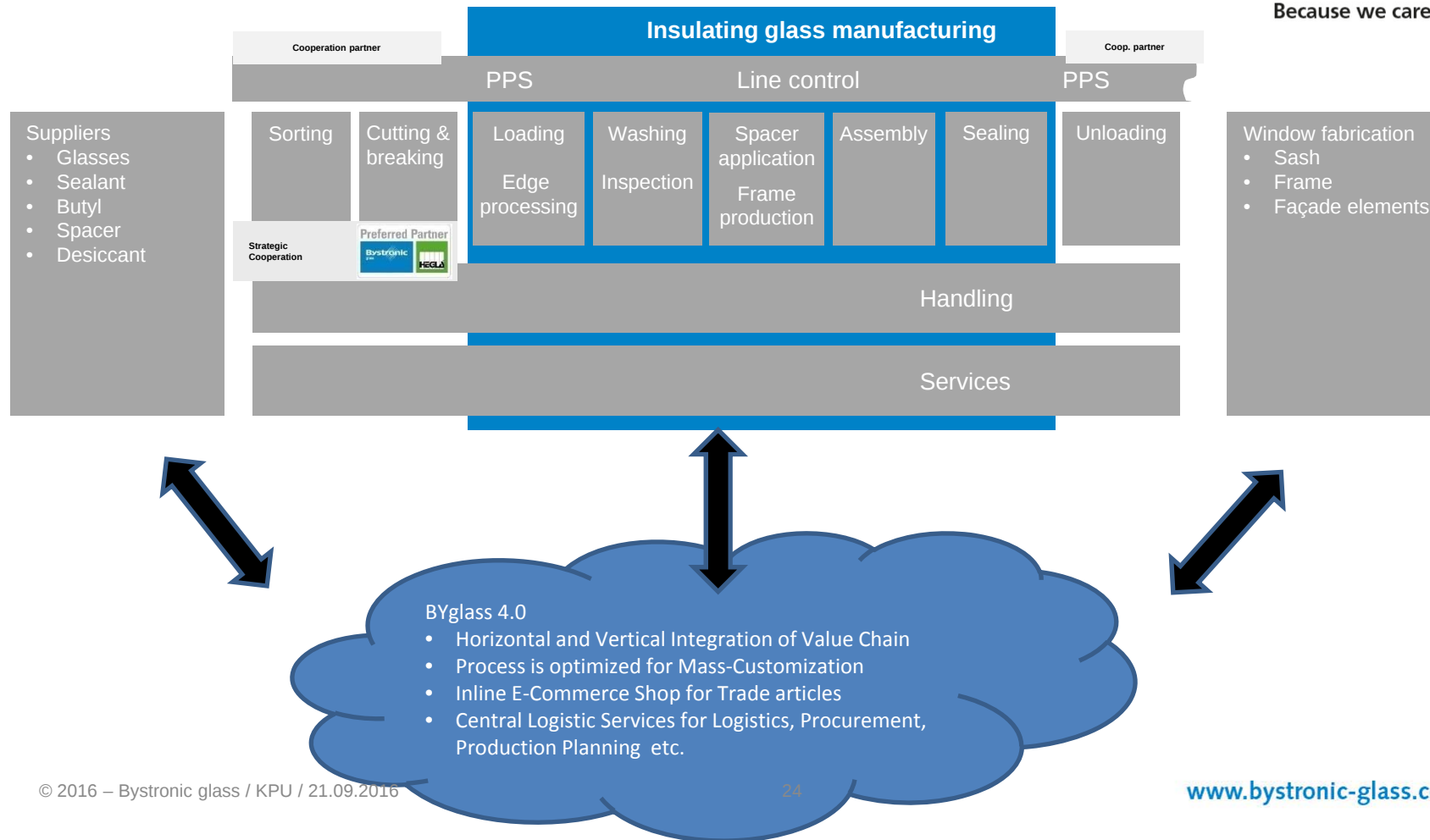
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Byglass 4.0 - 2020



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Vielen Dank für Ihre Aufmerksamkeit

