

KOMERCIJALNO-TEHNIČKO PREDAVANJE / *COMMERCIAL- TECHNICAL PRESENTATIONS*

PLASMA CUTTING MADE FOR SMART FACTORY

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Key words: Plasma Cutting, Digital Transformation. IIoT, Industry 4.0

Abstract:

Plasma Cutting is a well-established technology for cutting heavy metal sheets and pipes up to a thickness of 150 mm. Newest processes enabling an extraordinary speed and quality of cutting surface also on inner contours and circular cuts. However the latest Plasma Cutting machine developments do not only impress with even faster and now also quieter cuts, but qualify the machines for the smart factory of the future. The article is describing the current state of the art in Plasma Cutting, referring cutting speed, quality and sheet thickness that is cuttable.

Furthermore the computational capability of the machine control and the new connectivity of the new Kjellberg Finsterwalde Q3000 machine will be explained linked with the new digital product and service features on board. Thus the contribution gives a forecast of the benefits expected due to predictive maintenance, operator's assistance, operating statistics and consumption history, remote maintenance and e-update and how this fits with the requirements of the ongoing change to smart factories.



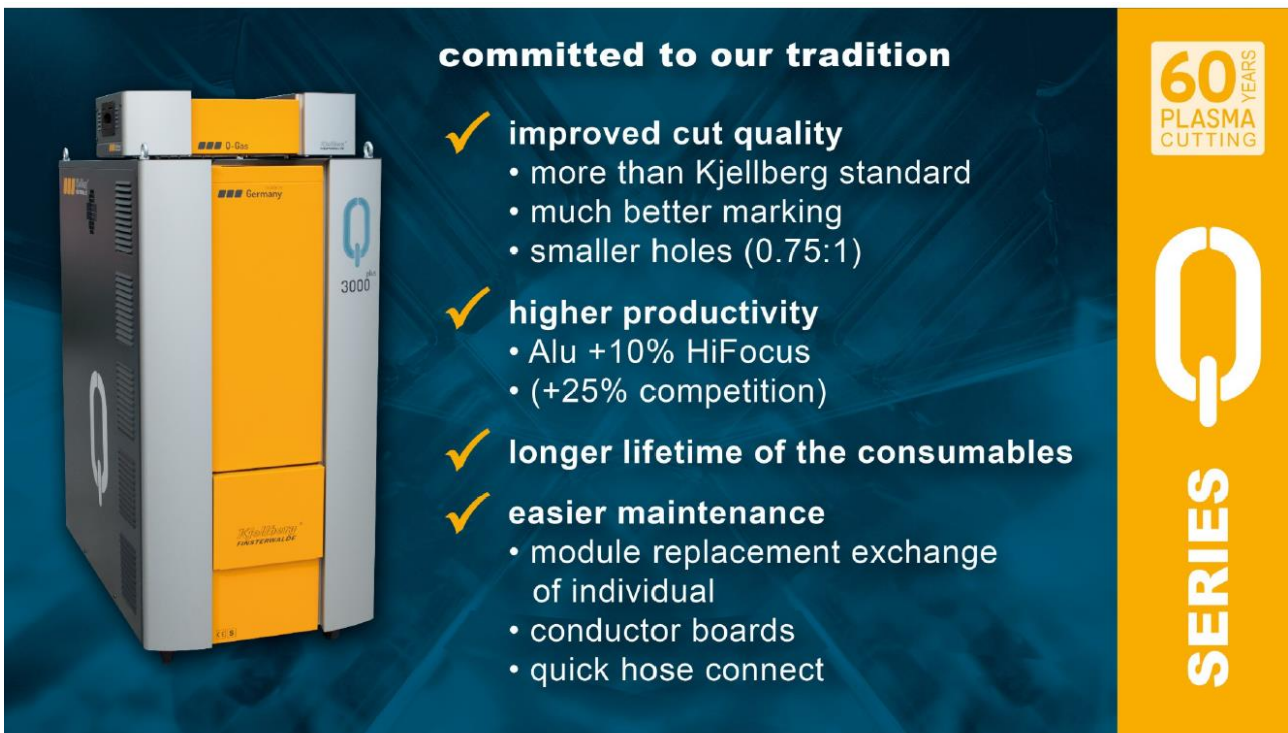
**Kjellberg®
FINSTERWALDE**

Online Monitoring
Smart Maintenance
Smart Grids
Always On
Q-Desk
eService
IBN 4.0
Academy 4.0
Kjellberg App
eLearning
Smart Factory
Retrofit 4.0

4.0 K

**Plasma Cutting
made for Smart Factory**

**60 YEARS
PLASMA
CUTTING**



committed to our tradition

- ✓ **improved cut quality**
 - more than Kjellberg standard
 - much better marking
 - smaller holes (0.75:1)
- ✓ **higher productivity**
 - Alu +10% HiFocus
 - (+25% competition)
- ✓ **longer lifetime of the consumables**
- ✓ **easier maintenance**
 - module replacement exchange of individual
 - conductor boards
 - quick hose connect

**60 YEARS
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CUTTING**

Q

SERIES



**Tradition hat nur dann einen Sinn,
wenn der Wille zu noch größeren
Taten vorhanden ist.**

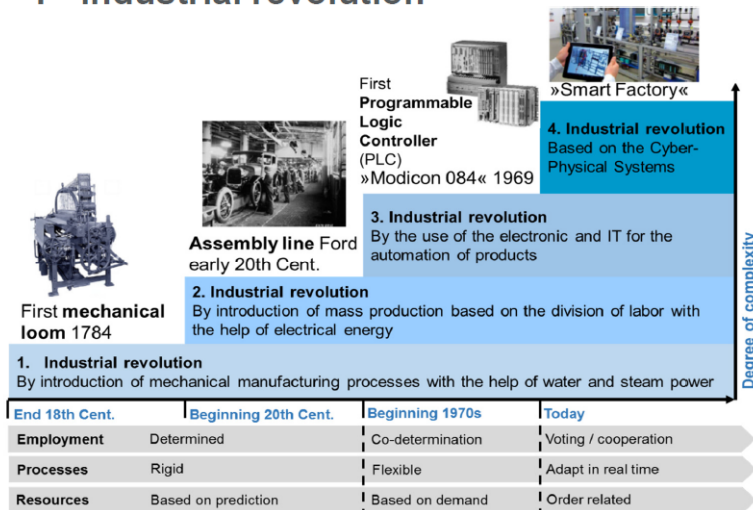
**Tradition only makes sense
if there is the will
to do even greater deeds.**

Frank Kremer
Erster Präsident des 1. FC Köln
First President of 1. FC Köln

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4

4th industrial revolution

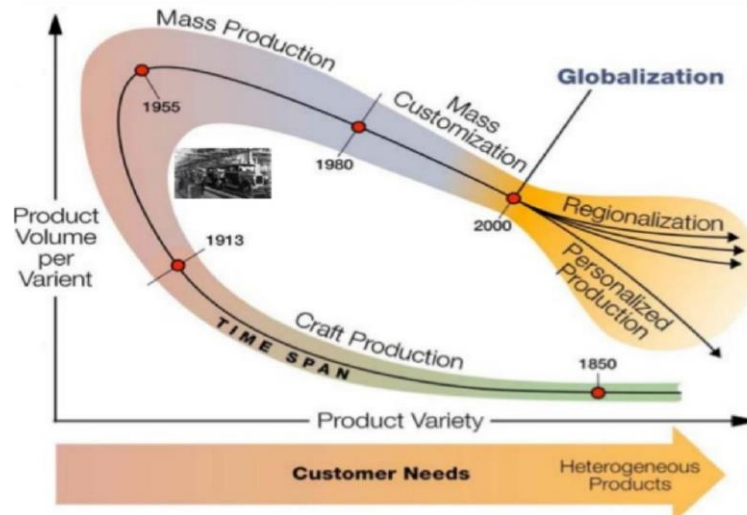


revolutionary promise:

- most productive and effective
- most adaptable, flexible in quantity and variants
- new business models
- more customers binding
- more service and aftersales business



„The global Manufacturing Revolution“ Yoram Koren

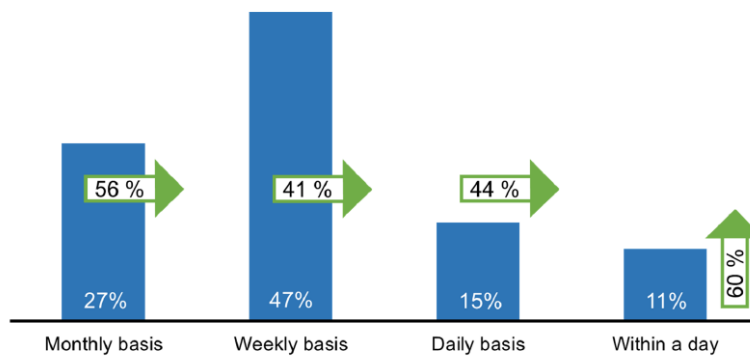


Dynamic of Market is increasing...

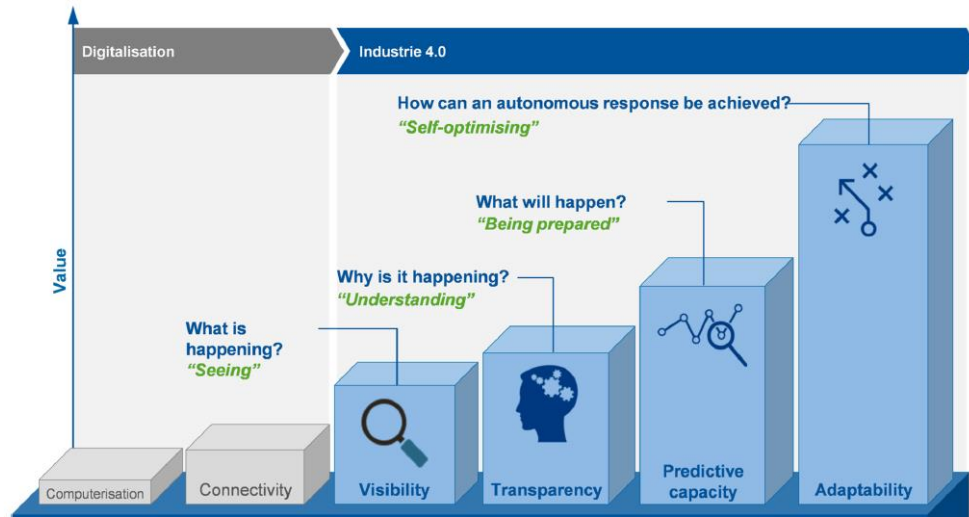
So many enterprises ...

■ ... today have strong variations in human resources.

■ ... will face strong variations in the future.



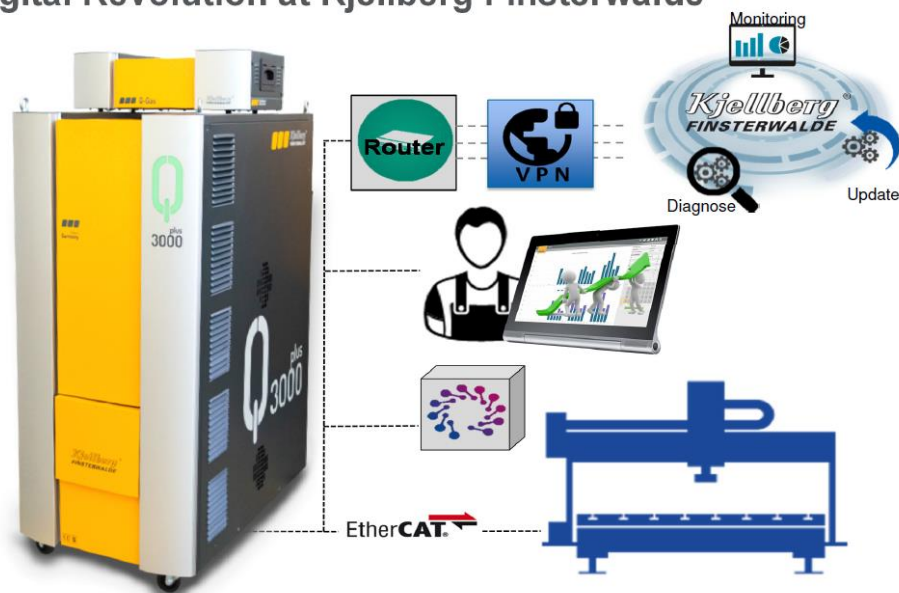
Industry 4.0 transition



Quelle: FIR.ev



Q-series – Digital Revolution at Kjellberg Finsterwalde





visibility at every end device



LAN

- ✓ process configurator and detailed help files
- ✓ maintenance reserve and operating data visualization
- ✓ consumption display with calendar function

60 YEARS
PLASMA
CUTTING

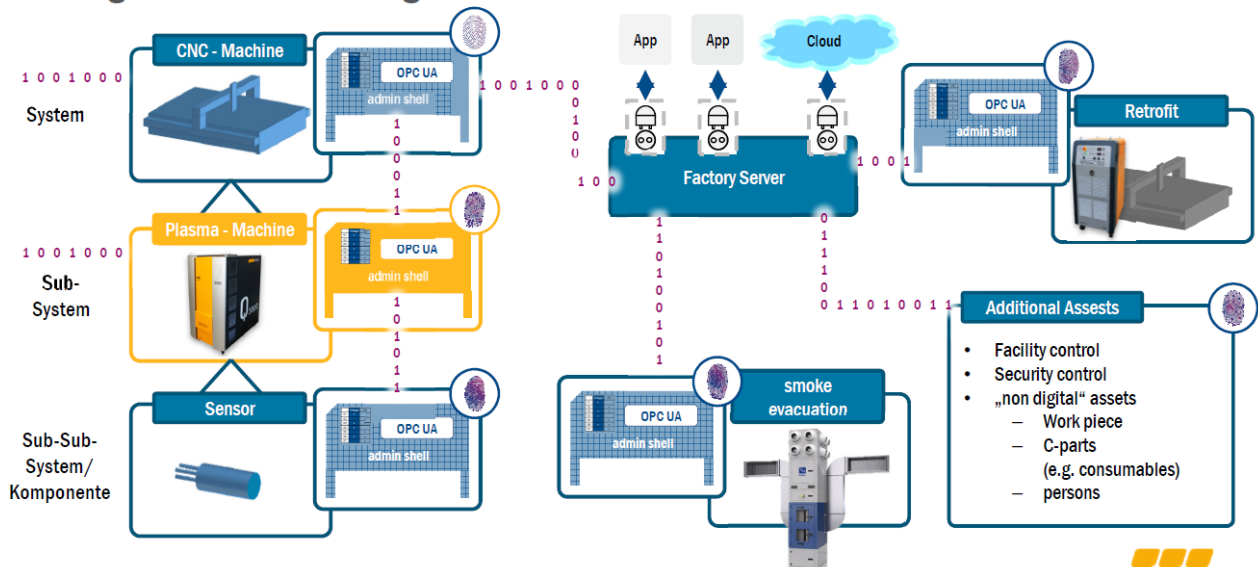
Q

SERIES

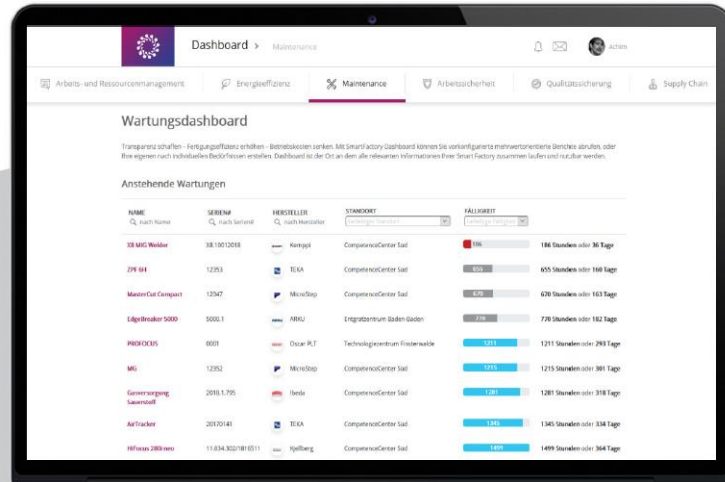
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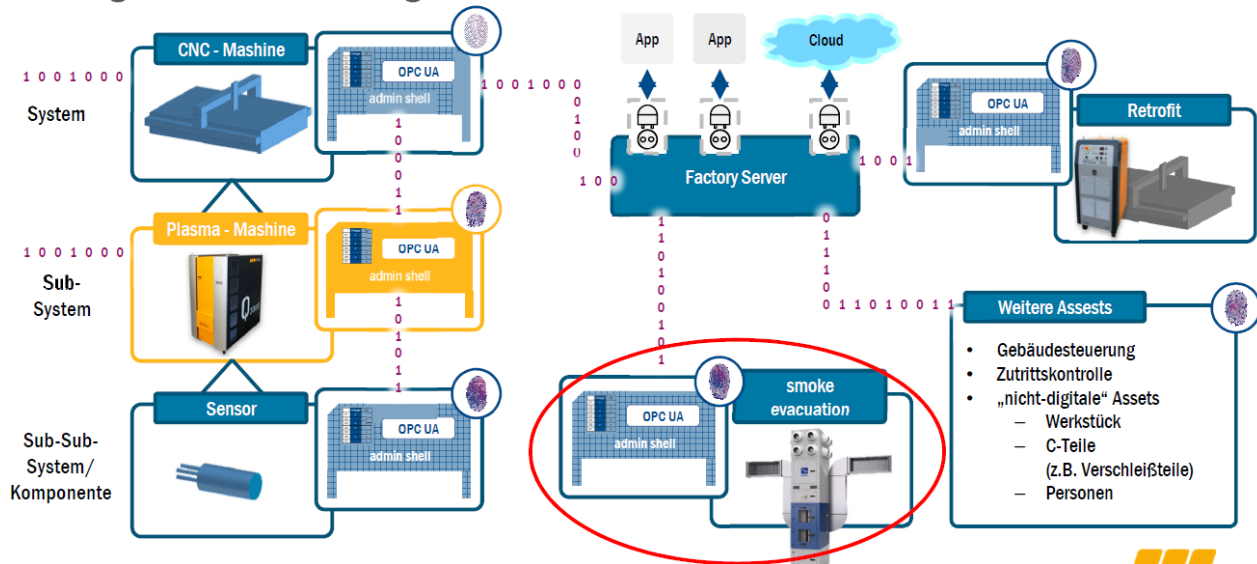
digital network integration



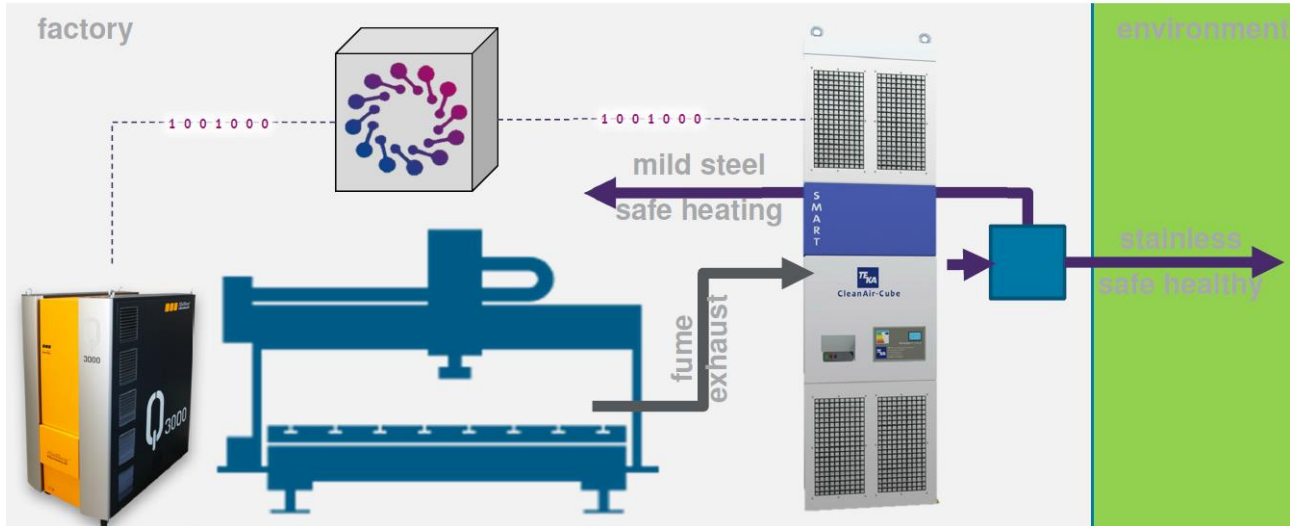
factory app



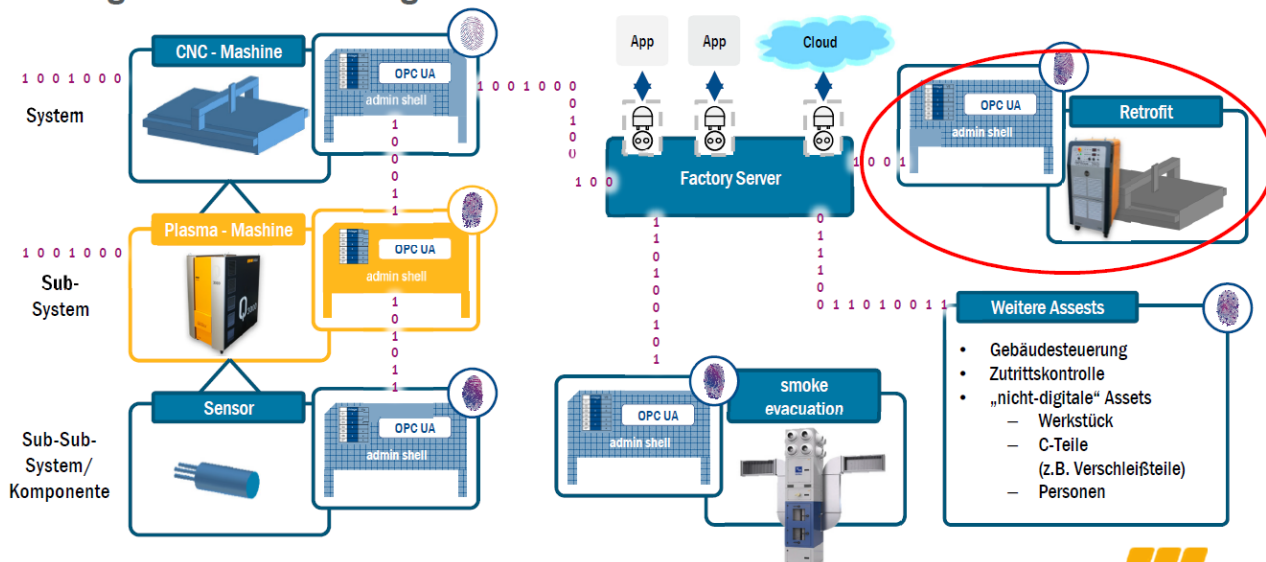
digital network integration



self adaption & machine interaction



digital network integration



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IBN-Testbed „Retrofit 4.0“



Machines developed for Industry 3.0

optimized for automation and communication with CNC machine

- serial interface (RS 485) as slave
- parallel interface (hardwire) for fast communication
- microcontroller control designed for controlling the plasma process only

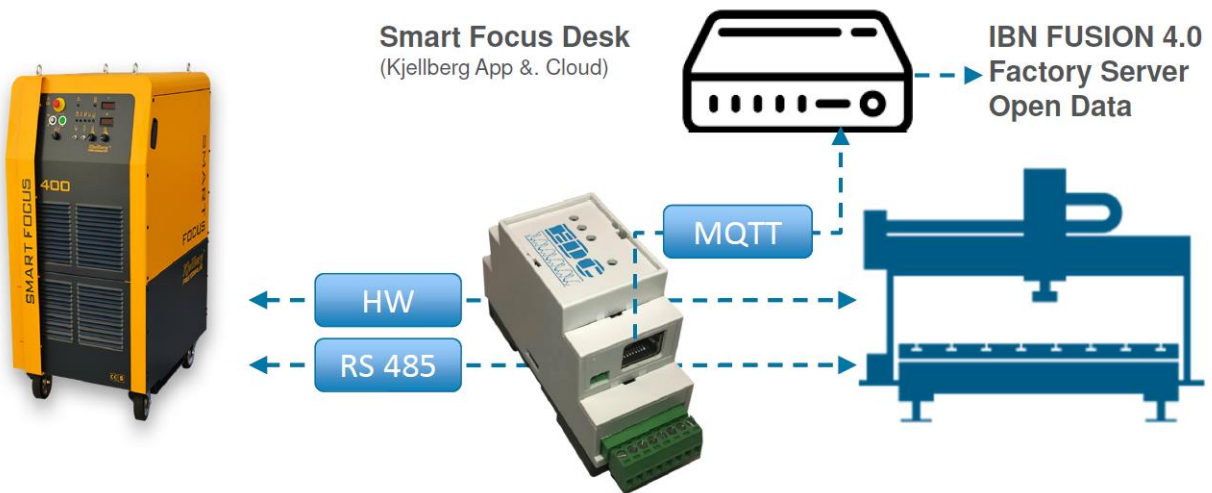
→ lack of hardware and software for real I4.0 solutions (e.g., connectivity)



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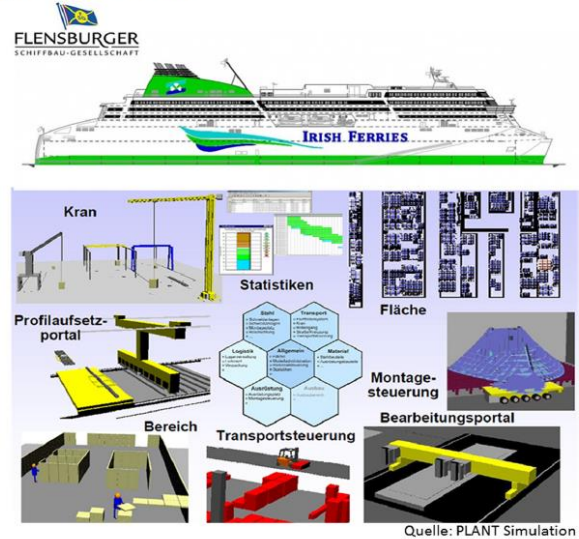
IBN-Testbed „Retrofit 4.0“

approach



Optimisation due to digital twin of production

- planning optimization through dynamic simulation
- assignment of production capacities and employees
- daily update model to account for deviations from the plan
- **Lessons learned:**
- Model allows a productivity increase of 50% and less weekend and holiday work
- robust (simple) technologies bet sophisticated high technologies
- adaptive machine are joker cards



adaptable machines for the versatile factories

Q-plus series adapts to your tasks!

- ✓ upgradeable from 150 to 450 A
- ✓ to increase productivity or sheet thickness
- ✓ sale or lease of additional plasma power as a business model



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conclusions

- Industry 4.0 will change our business
- digital Revolution is no event, but a process
- Industry 4.0 can not be realized as a single company project
- Interoperable solutions are needed realized in cross company collaboration project

- team up with other companies
- join with Kjellberg in Industry Business Network 4.0



**INDUSTRY
BUSINESS
NETWORK 4.0**



first demonstration- EuroBLECH 2018



7 networked stands, among others:
5 Kjellberg plasma machines
4 different CNC machines
a total of 21 assets on a common dashboard
Manufacturer overarching & interoperable!



Opening:

Competence Centre Plasma 4.0



INDUSTRY
BUSINESS
NETWORK 4.0

official test bed

