

SMART FACTORY

EFFICIENT, PROFITABLE AND SECURE



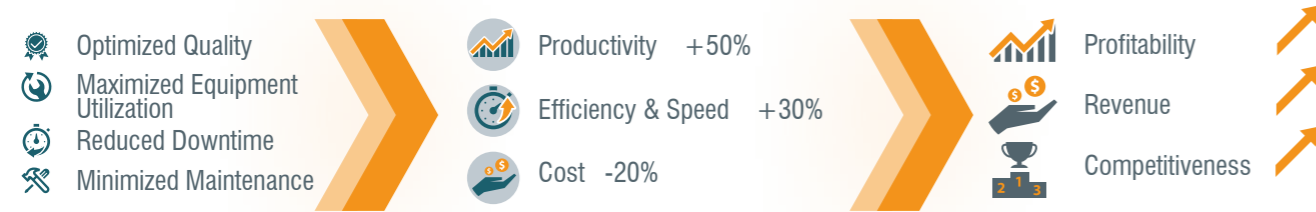
MÜHLBAUER'S SMART FACTORY SOLUTION

As an international company, one of Mühlbauer's business lines meets the needs of local and global card manufacturers. With almost 30 years experience in the manufacturing of systems for the smart card industry, our know-how encompasses a broad portfolio of machinery and software solutions – from card production through personalization and issuance, to consulting, implementation, realization and service.

Mühlbauer has a holistic view on the different building blocks like software, hardware and data that are working together to build a robust ecosystem.

To manage your production even more efficiently, Mühlbauer has launched a professional Smart Factory solution for the complete automation of shopfloors, specifically for ePassports, Smart Card, RFID, Semiconductor Backend and eMobility markets.

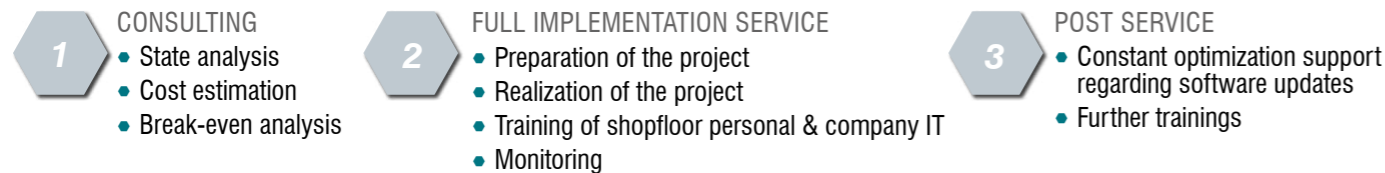
KEY BENEFITS OF A SMART FACTORY IMPLEMENTATION



YOUR WAY TO HIGHER PROFITABILITY

Mühlbauer takes full responsibility for all important milestones for the successful implementation of a smart factory ecosystem – whether it is the transition of already existing factories or as a greenfield approach for completely new factories.

Right from the beginning we accompany our clients through the whole project – and beyond. We take pride in supporting state and private customers on all five continents enhancing their production capabilities.

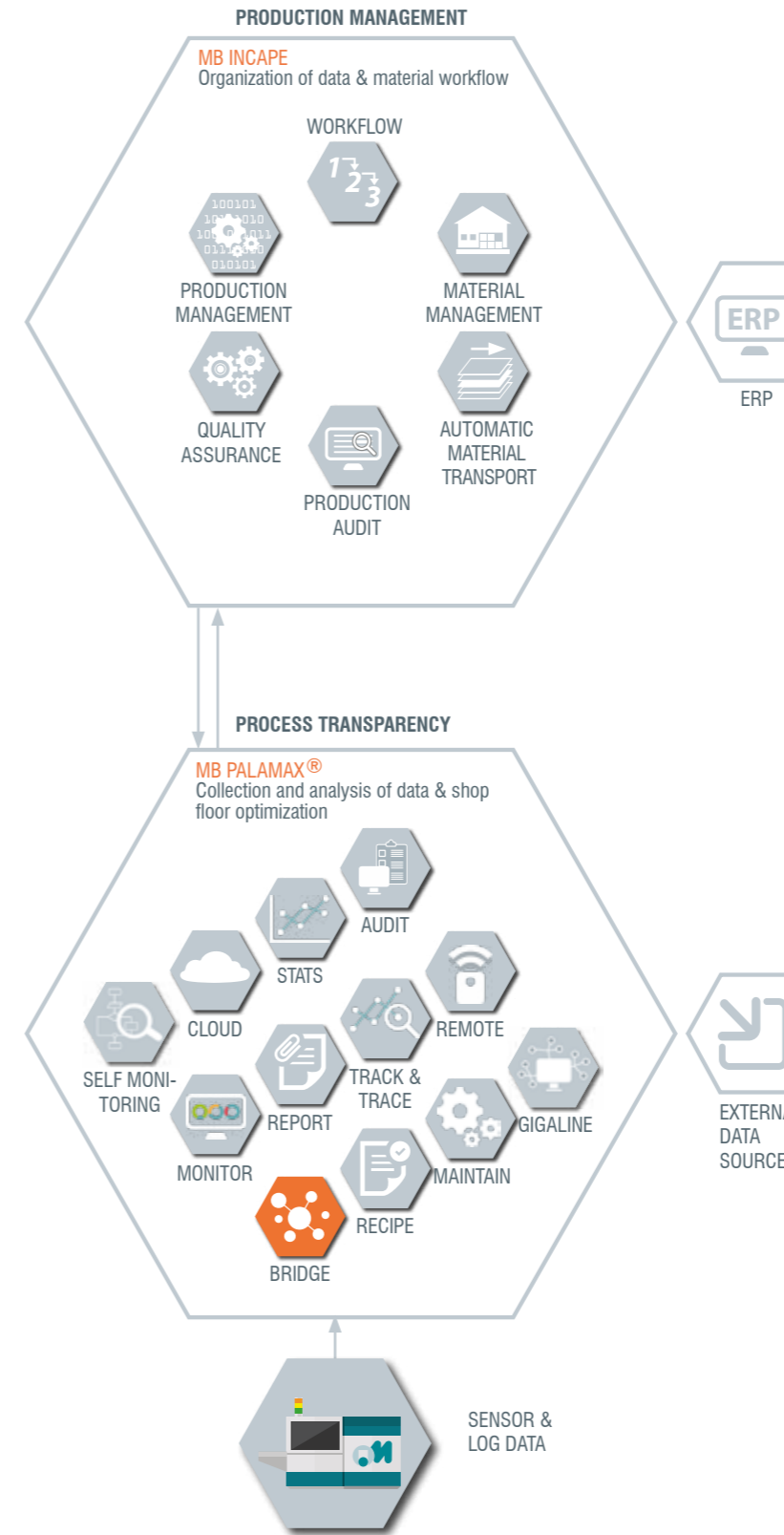


WHAT IS SMART FACTORY?

The Smart Factory concept is a main determinant of the official high tech strategy of the Federal Republic of Germany as part of the future-oriented strategy "Industry 4.0". The vision of a Smart Factory includes the self-organizing principle of a manufacturing environment in which machines, single modules, entire systems, products, materials and humans organize themselves.

Cyber-physical systems and sensors serve as the basis for communicating with each other through Internet of Things (IoT) technologies. Especially the miniaturization of sensors as well as the increased power for the processing of huge data make it possible to generate a huge amount of information, which can be processed, analyzed and ultimately also monetized.

A further step in this future scenario is the direct communication between the product (work piece) and the production system: the product brings all the necessary manufacturing information in electronic form with it, e.g. on an RFID chip. Based on this data, the way of the product through the complete production chain can be tracked and traced.



MODULAR & INDEPENDENT

The Mühlbauer Smart Factory Software Solution consists of two independent systems: MB INCAPE and MB PALAMAX®. Both systems are flexible and modular and already successfully used in Mühlbauer production sites and at many of our customer's locations worldwide. Together they build a robust and secure platform for any future demands, therefore ensuring a high degree of investment security.

The Mühlbauer Smart Factory Solution is vendor-independent – even third-party systems can be integrated via the MB PALAMAX® Bridge (on request). Additionally, Business Process Modelling (BPM) allows for a high flexibility regarding adjustments of the production flow and product configurations.

AUTOMATED

Smart Production Management

The automation of workflows results in shorter cycle times, less operator interaction and also less operator-based mistakes.

Flexibility

Faster setup of machines and the possibility for a fine-grained production management lead to a priority-based manufacturing of orders.

Smart Logistics

Together with MB Warehouse management, MB INCAPE manages the complete material management for card and document – production and finally leads to reduced logistics costs.

UNDER CONTROL

Full Real Time Control During Production

Immediate reaction is possible, resulting in higher quality and less downtime.

Track & Trace Each Individual Product

Trace your product through the entire production process. This allows for the comparison of manufacturing runs with one another and the determination of possible reasons for production faults.

Minimized Maintenance

Switch from random stoppages to scheduled ones in order to be able to plan production downtimes in a deterministic manner.

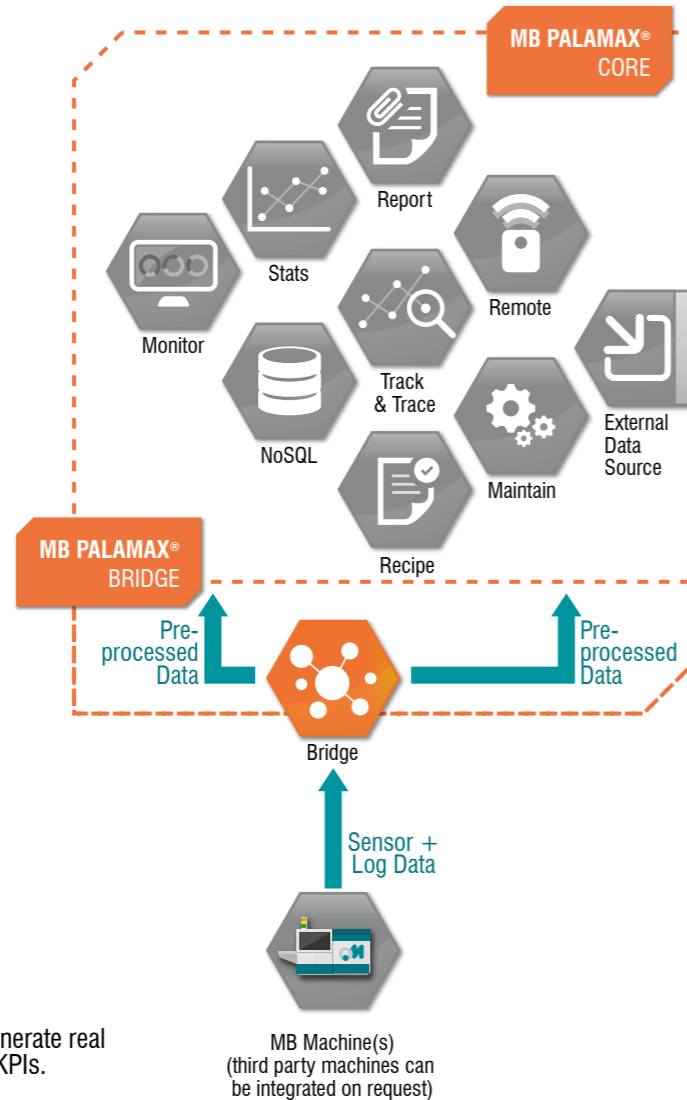
SECURED

The Mühlbauer Smart Factory Solution complies with the full production control requirements of the security industry, as well as with all security standards such as PCL. It is protected against data theft and industrial espionage.



MB PALAMAX®, Mühlbauer's Smart Factory solution, is supporting shop floors of any type, including semiconductor backends, ID and eMobility solution. Utilizing a NOSQL database, it is designed

to collect, process and analyze process data. This helps to monitor and improve your production. The collected process data is stored in batches for later processing, visualization and statistical analysis.



KEY FEATURES




- Monitor your production in real time & generate real production statistics with your preferred KPIs.
- Improve your transparency
- Gain better data to investigate, understand & portray process flows & relationships
- Run your production with improved security & optimally employed staff
- Intuitive & easy-to-use web interface
- Responsive user interface design allows optimal presentation on any chosen device
- Data collection from the shop floor of Mühlbauer equipment & also third-party equipment (on demand)
- State-of-the-art big data software architecture ensures future reliability

MB PALAMAX® BRIDGE

- Universal data collector, handler and transformer
- Unlocks access to your machines
- Natively integrates with MB machines
- Integration of 3rd party machines on demand
- Integration with 3rd party MES on demand



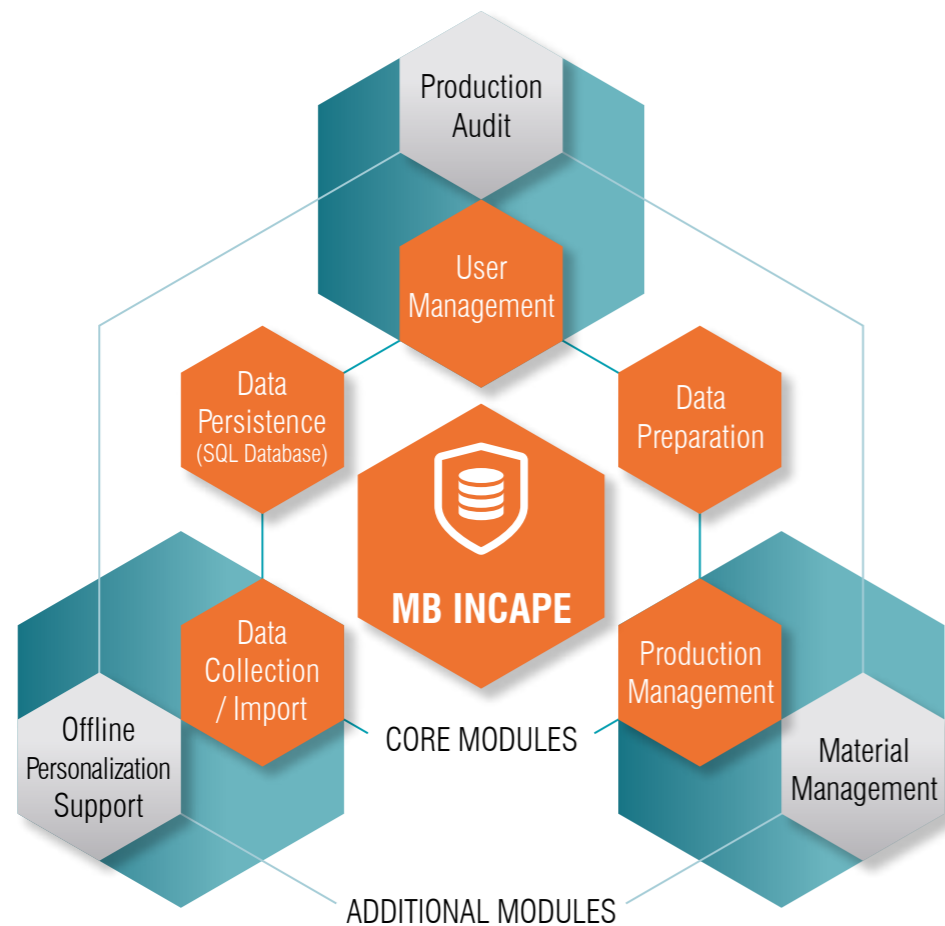
FEATURES & ADVANTAGES

-  **PALAMAX.MONITOR**
Monitors the real-time performance of the production
-  **PALAMAX.STATS**
Statistical tool which analyzes collected data & delivers customized statistics on OEE and TEEP
-  **PALAMAX.REMOTE**
Enables the remote operation of machines on the shop floor from a control centre
-  **PALAMAX.AUDIT**
Allows for the auditing of single manufacturing runs
-  **PALAMAX.MAINTAIN**
Enables the implementation of preventive maintenance based on predefined rules
-  **PALAMAX.TRACK&TRACE**
Increases effectiveness & efficiency so that production becomes more profitable
-  **PALAMAX.RECIPE**
Enables production engineering to prepare & test a repeatable factory set-up. Factories can switch between products within minutes.



MB INCAPE is Mühlbauer's Production Management Software for the production and personalization of electronic cards and documents (e.g. ID cards, ePassports, Driver's Licenses, EMV or GSM cards). Combining data management, production control and material management, the system allows for highly automated processes. MB INCAPE's architecture consists of a modular concept to fulfil the needed scalability in all kinds of

document body production steps, as well as in all types of personalization characteristics, for example centralized and decentralized processes, various types of personalization machines or application-specific data preparation scenarios. It allows to process customer- and application-specific production, personalization, quality control and document delivery scenarios with highest solution flexibility.



FEATURES & ADVANTAGES

-  Configurable workflow steps regarding personalization, quality assurance & issuance
-  Fully-automated processing & production management
-  Simplified administration due to web-based operator clients
-  Customizable UI regarding localization, internationalization & branding
-  Scalability regarding different documents, machines and personalization locations
-  Seamless tracking of documents from point of production to issuance
-  Flawless integration of Mühlbauer material management (MB WAREHOUSE)
-  Connection to carddocument management systems via web service, database & file-based interface
-  Standard interface to personalization machines with integration of third-party machines possible
-  Integration of MB USER MANAGEMENT
-  Full coverage of production control requirements (security industry & EMV standards)
-  Seamless connection to MB PALAMAX® and MB DATA PREPARATION





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