

# SMART FACTORY

EFFICIENT, PROFITABLE AND SECURE



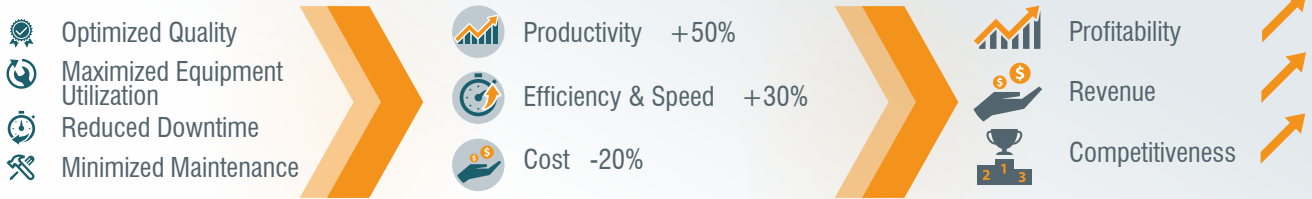
# MÜHLBAUER'S SMART FACTORY SOLUTION

As an international company, Mühlbauer serves 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 Smart Card, ePassports, RFID and Semiconductor Backend markets.

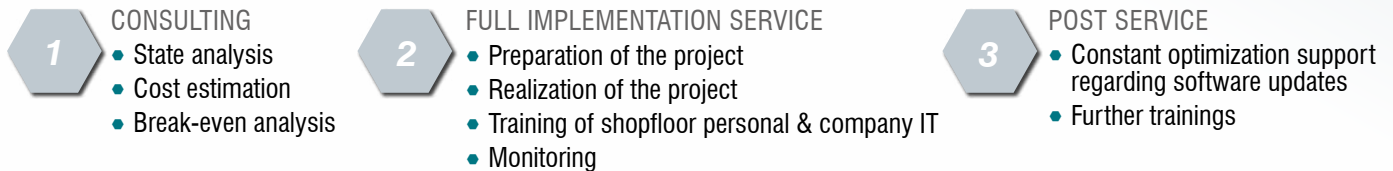
## KEY BENEFITS OF A SMART FACTORY IMPLEMENTATION



## 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 nations on all five continents enhancing their security infrastructure.



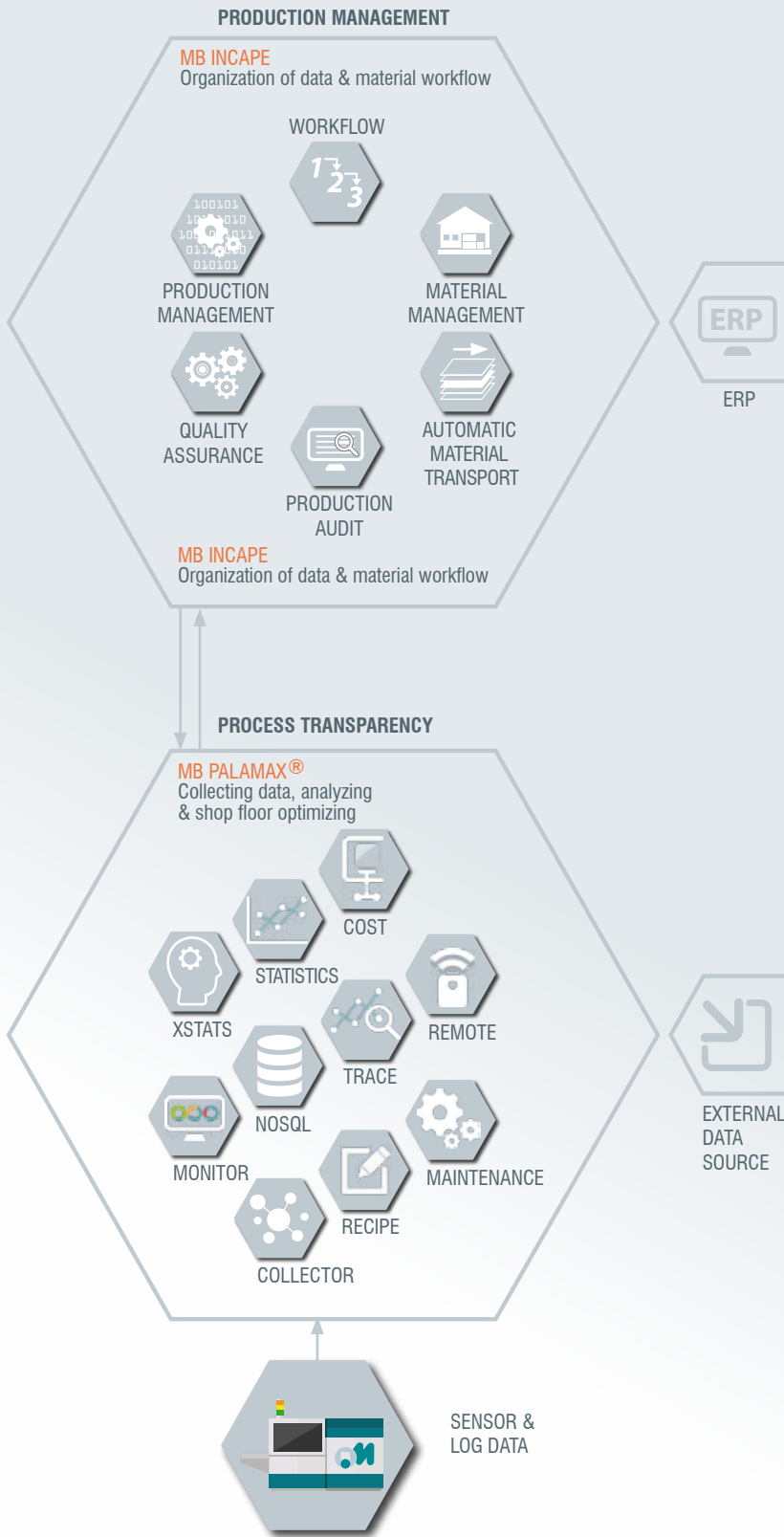
## WHAT IS SMART FACTORY?

The Smart Factory concept is a main determinant of the official high tech strategie 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.

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, i.e. on an RFID chip. Based on this data, the way of the product through the complete production chain can be tracked and traced.

Cyber-physical systems and sensors serve as the basis for communicating with each other through the Internet of Things 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.





## 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 bridge application (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 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®

## TOTAL PROCESS TRANSPARENCY

MB PalaMax®, Mühlbauer's Smart Factory solution, is developed for card, tag or booklet productions, personalization factories and semiconductor backend shop floors. Consisting of an NOSQL database, it is designed to set and collect process data

to monitor and improve the efficiency of production and personalization. The collected process data is stored in big data sets for later processing, visualization and statistical analysis.





## 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



### PALAMAX.REMOTE

Enables the remote operation of machines on the shop floor from a control centre



### PALAMAX.TRACE

Allows for the auditing of single manufacturing runs



### PALAMAX.MAINTAIN

Enables the implementation of maintenance on demand



### PALAMAX.COST

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.

## KEY FEATURES

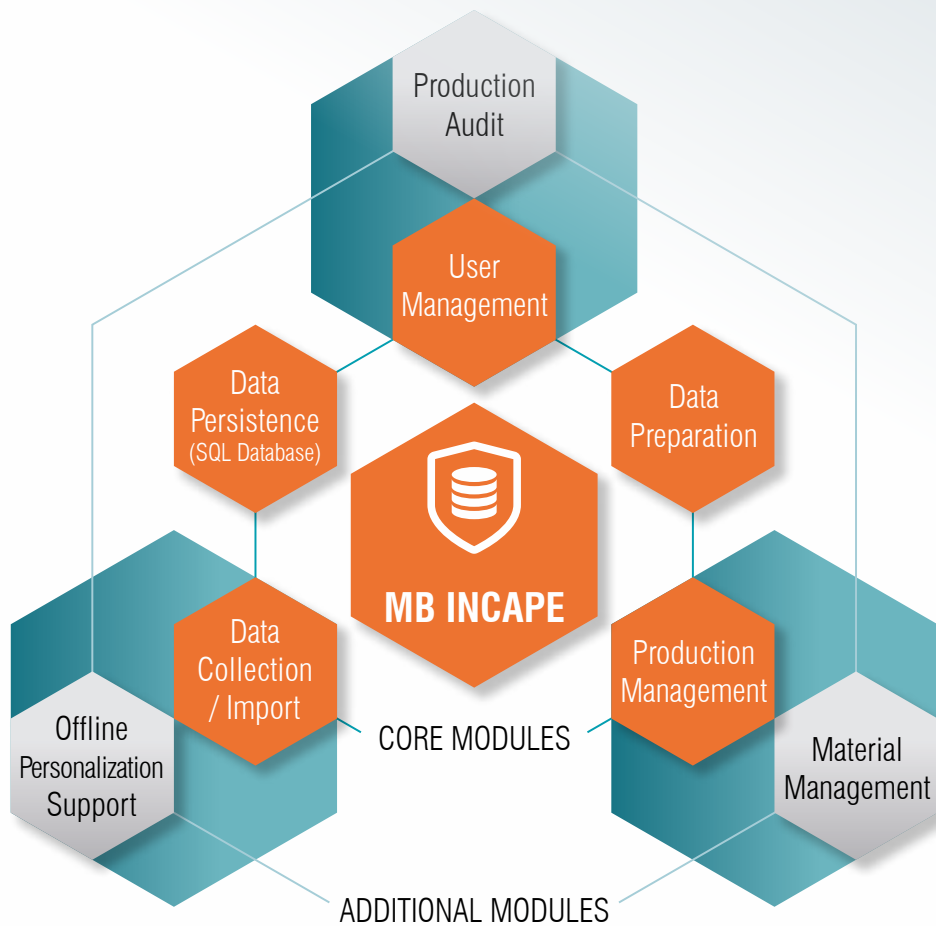
- Monitor your production in real time & generate real production statistics with your preferred KPIs. (for specific chip types only)
- Improve your transparency
- Gain better data to investigate, understand & portray process flows & relationships
- Run your production with improved security & optimally 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
- State-of-the-art big data software architecture ensures future reliability



# MB INCAPE

INTEGRATED PRODUCTION MANAGEMENT SOFTWARE

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



### MÜHLBAUER GERMANY

Mühlbauer Group Headquarters  
Josef-Mühlbauer-Platz 1, 93426 Roding, Germany  
Phone: +49 9461 952 0, Fax: +49 9461 952 1101  
info@muehlbauer.de, www.muehlbauer.de

### MÜHLBAUER USA

Mühlbauer Inc.  
226 Pickett's Line  
Newport News, VA 23603-1366, USA  
Phone: +1 757 947 2820, Fax: +1 757 947 2930  
info@muhlbauer.com, www.muhlbauer.com

### MÜHLBAUER MALAYSIA

Muehlbauer Technologies Sdn. Bhd.  
No. 3 Jalan TU 62, Taman Tasik Utama,  
75450 Melaka, Malaysia  
Phone: +60 6 2517 100, Fax: +60 6 2517 101  
info@muehlbauer.com.my, www.muehlbauer.com.my

### MÜHLBAUER SERBIA

Mühlbauer Technologies d.o.o.  
Evropska 17, 22300 Stara Pazova, Serbia  
Phone: +381 22 215 5100, Fax: +381 22 215 5130  
serbia@muehlbauer.de, www.muehlbauer.de

### MÜHLBAUER CHINA

Muehlbauer Technologies (Wuxi) Co., Ltd.  
No 23. Huayi Road, Wuxi New District  
214135 Wuxi, Jiangsu, China  
Phone: +86 510 8190 0100, Fax: +86 510 8190 0101  
info@muehlbauer.cn, www.muehlbauer.cn

### MÜHLBAUER SLOVAKIA

Muehlbauer Technologies s.r.o.  
Novozámocká 233, 94905 Nitra, Slovakia  
Phone: +421 37 6946 000, Fax: +421 37 6946 501  
info@muhlbauer.sk, www.muhlbauer.com



## MÜHLBAUER GMBH & CO.KG

Josef-Mühlbauer-Platz 1 | 93426 Roding | Germany  
Tel.: +49 9461 952 0 | Fax: +49 9461 952 1101  
Mail: info@muehlbauer.de | Web: www.muehlbauer.de