

Real Data, Zero Effort – with Motion-Mining®





How do you Penetrate the Black Box?

Status quo and expectations

BLACKBOX

- Which methods are currently used?
- Which problems arise here?
- What are your expectations for new technologies?

INPUT

OUTPUT



What Does a Common Process Analysis Look Like?

Significant effort caused by many manual activities

process documentation

measure and observe (REFA)

evaluation of databases

target time determination (MTM)

create analysis

process optimization

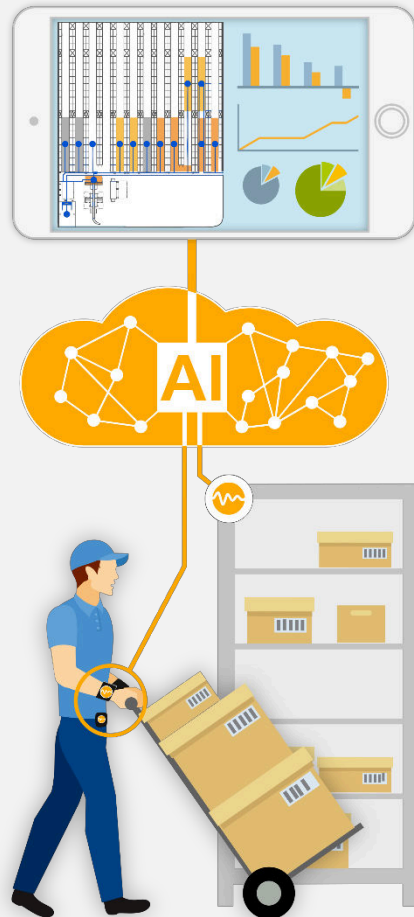
reporting

ergonomics improvements



Our Solution: Motion-Mining®

Automated measurement and analysis of manual activities



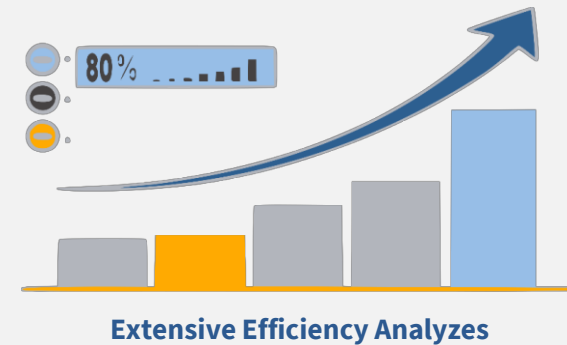
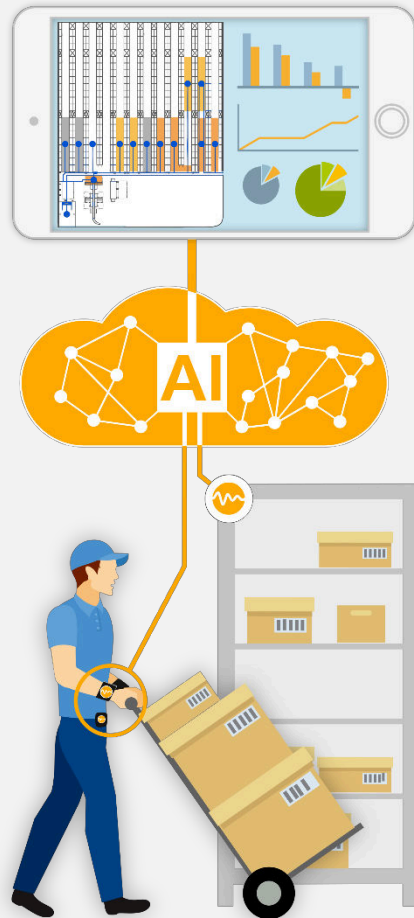
Motion-Mining® enables an automatic analysis of your work processes, e.g., in logistics or production.

- 📊 Your employees wear three wearables on their wrists and belt to record the various activities.
- 📡 The localization takes place via micro-radio transmitters, so-called beacons.
- 📊 The obtained data is automatically analyzed. Individual activities and process steps are recognized using a self-developed, state-of-the-art deep learning pattern recognition solution.
- 📊 This delivers very precise process indicators

Efficiency and ergonomic optimization measures – tailored to your needs.

Our Solution: Motion-Mining®

Automated measurement and analysis of manual activities



Unique Selling Propositions (USPs)

Advantages of Motion-Mining®

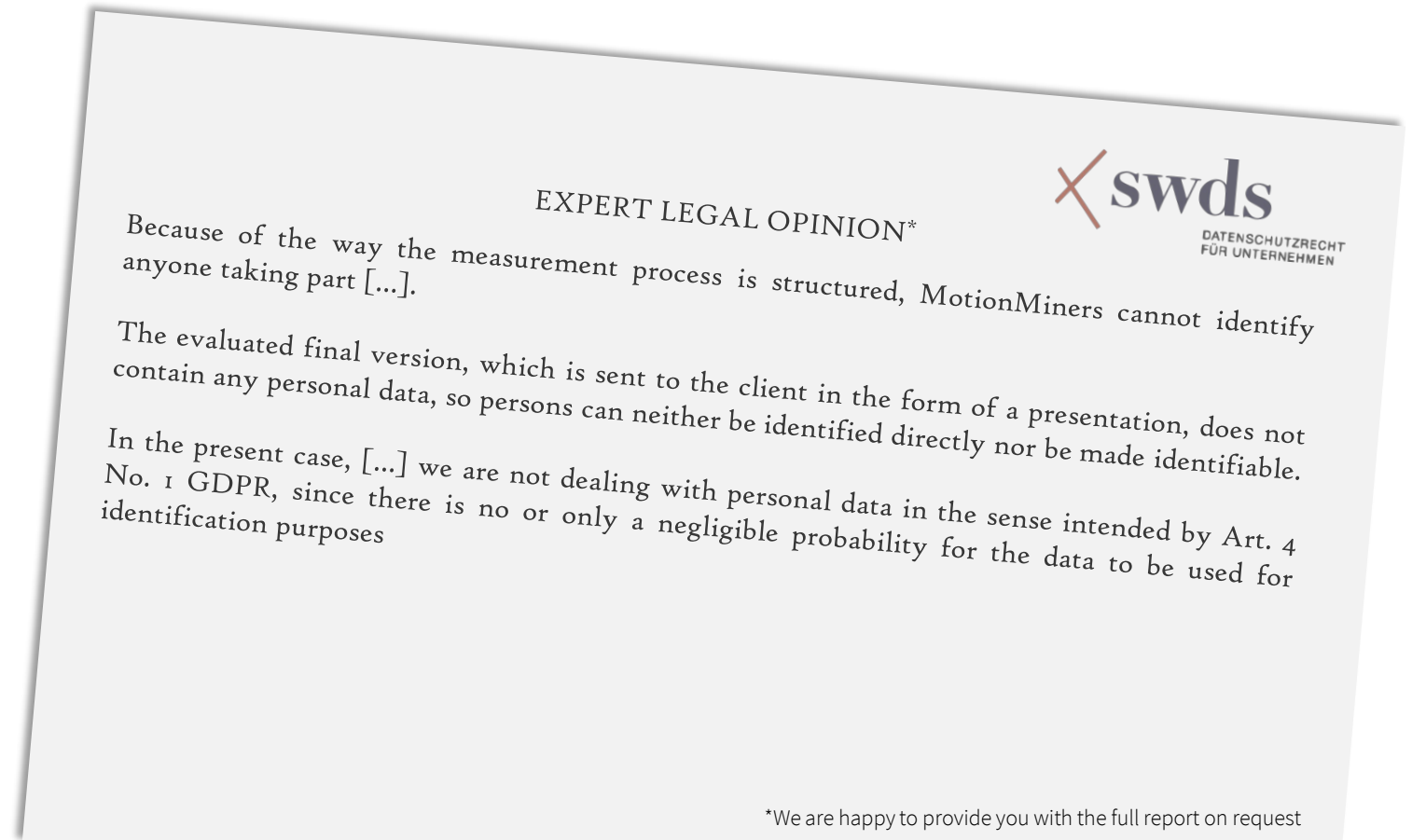


Motion-Mining and the GDPR

Legal assessment of the measurement process and the technology

Legal opinion confirms:

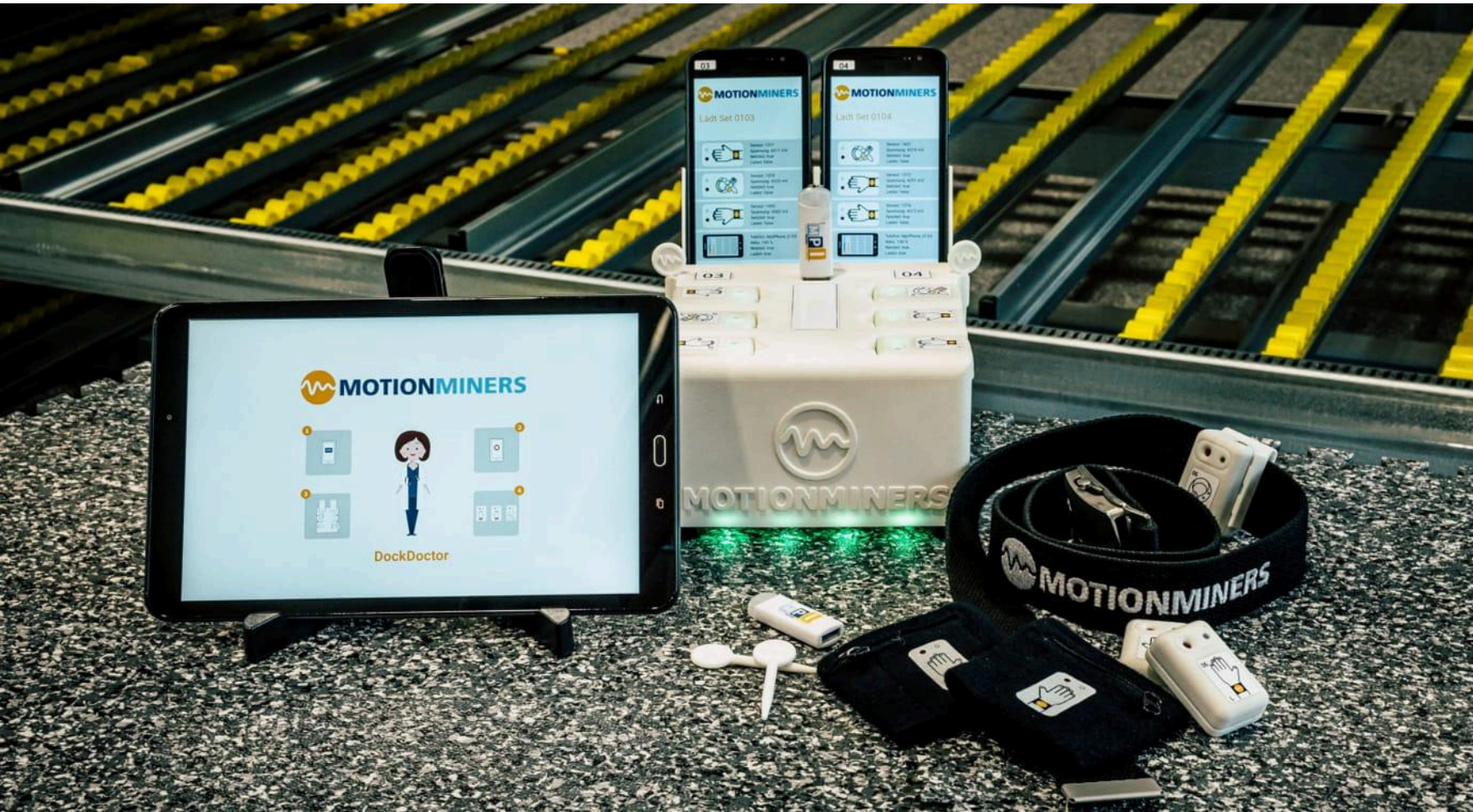
- No collection of personal data
- Personal data is therefore not processed
- The GDPR do not apply to Motion-Mining-Analysis



*We are happy to provide you with the full report on request

The Motion-Mining-Technology

User-friendly measuring equipment



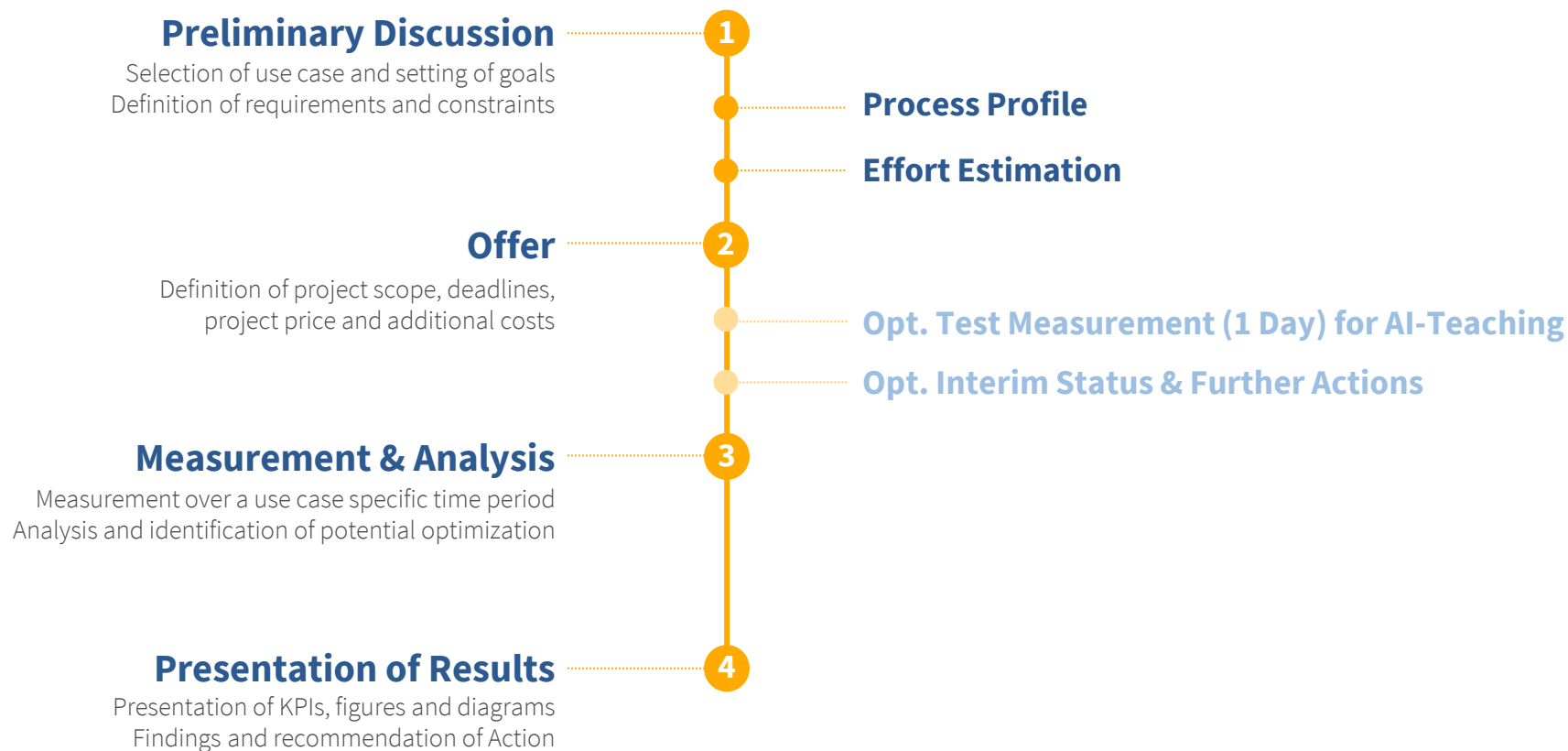
We offer Motion-Mining®
as a **service**
and as a **product**

- 📶 Your employees can independently collect the measured data
- 📶 Our measuring equipment allows your employees full freedom of movement
- 📶 Our first-aid app "DockDoctor" will help you with any questions you may have.



Consulting Services

The Motion-Mining® approach





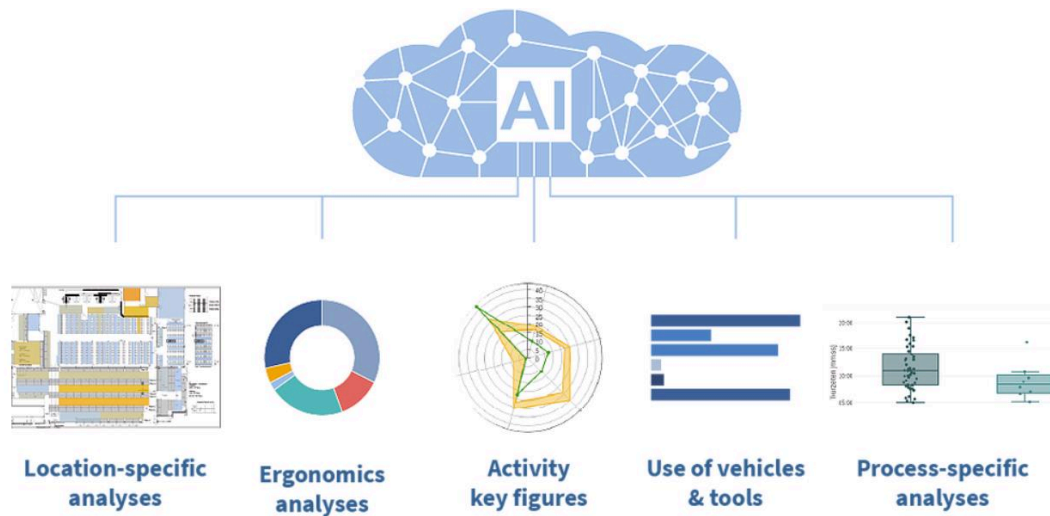
The Product – Manual Process Intelligence (MPI)

Process information retrieved quickly & easily thanks to the measuring case & MPI platform



User-Friendly Analysis Dashboard

AI assisted data evaluation



The analysis dashboard of the MPI platform allows you to create and evaluate the processes:

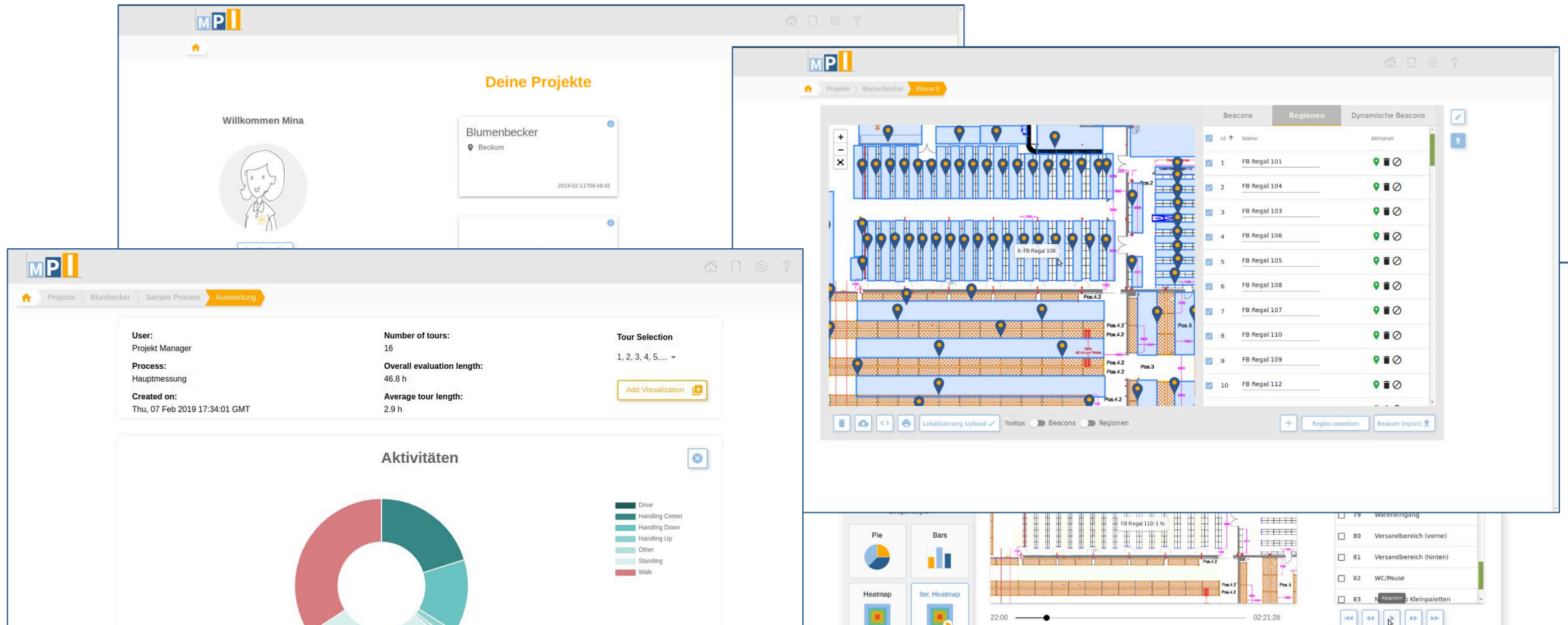
- Evaluation of uploaded measurement data by AI models
- Generation of specific key figures
- Choice of graphical depictions
- Reporting and export functions





Die MPI-Plattform

Available under mpi.motionminers.com



The image displays three overlapping screenshots of the MPI platform interface, illustrating its various functionalities:

- Top Left Screenshot (Home/Project Overview):**
 - Header: MPI logo and navigation icons.
 - Greeting: "Willkommen Mina" with a user profile icon.
 - Section: "Deine Projekte" (Your Projects).
 - Project Card: "Blumenbecker" (Beckum) with a timestamp "2019-02-11T09:48:42".
- Bottom Left Screenshot (Project Details/Analysis):**
 - Header: MPI logo and navigation tabs: "Projects", "Blumenbecker", "Sample Process", "Auswertung".
 - User Information:
 - User: Projekt Manager
 - Process: Hauptmessung
 - Created on: Thu, 07 Feb 2019 17:34:01 GMT
 - Statistics:
 - Number of tours: 16
 - Overall evaluation length: 46.8 h
 - Average tour length: 2.9 h
 - Tour Selection: 1, 2, 3, 4, 5, ... (dropdown menu)
 - Buttons: "Add Visualization" and "Lokalisierung Upload".
 - Section: "Aktivitäten" (Activities) with a donut chart showing activity distribution:
 - Drive (Dark Green)
 - Handling Center (Medium Green)
 - Handling Down (Light Green)
 - Handling Up (Teal)
 - Other (Light Blue)
 - Standing (Light Green)
 - Walk (Red)
- Right Screenshot (Map/Beacons):**
 - Header: MPI logo and navigation tabs: "Projects", "Blumenbecker", "Ebenen 0".
 - Main Map: A detailed floor plan with numerous blue location pins (beacons) and red lines indicating paths or regions.
 - Table: "Beacons" with columns "Id", "Name", and "Aktionen".

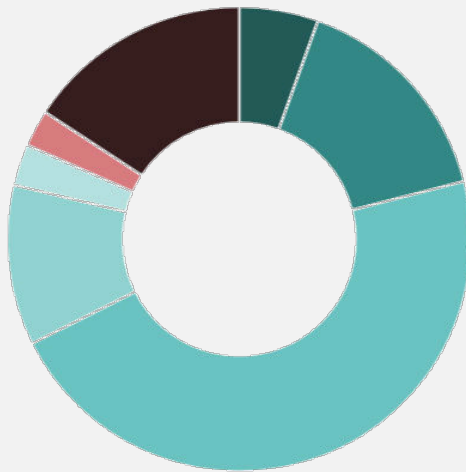
Id	Name	Aktionen
1	FB Regal 101	[Icons]
2	FB Regal 104	[Icons]
3	FB Regal 103	[Icons]
4	FB Regal 106	[Icons]
5	FB Regal 105	[Icons]
6	FB Regal 108	[Icons]
7	FB Regal 107	[Icons]
8	FB Regal 110	[Icons]
9	FB Regal 109	[Icons]
10	FB Regal 112	[Icons]
 - Buttons: "Region zuweisen", "Beacon Import", "Lokalisierung Upload", "Toolips", "Beacons", "Regionen".



General evaluations

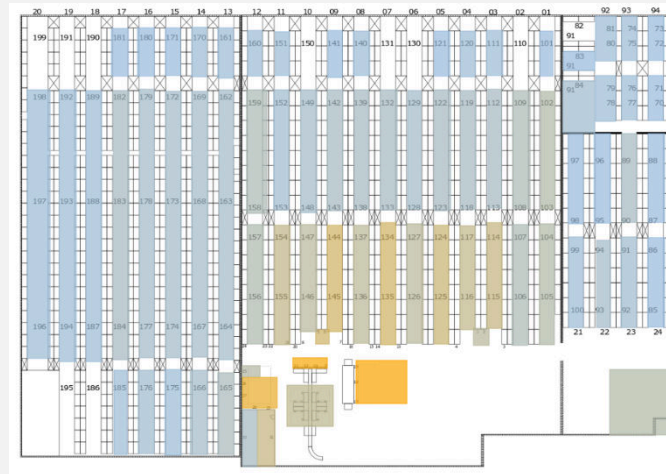
Three basic dimensions of analysis

activities



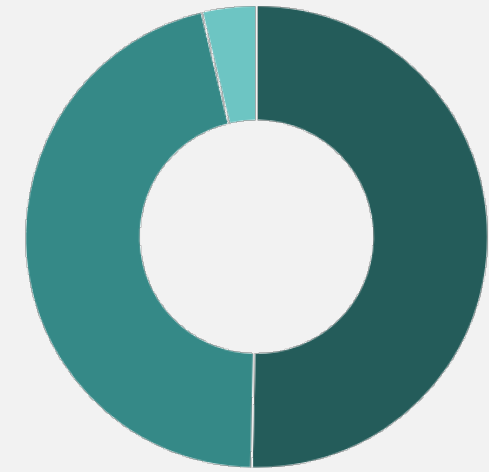
drive
 walk
 handling bended
 handling neutral
 sit
 other
 stand

localization



Anteil der Verortung:
 low high

ergonomics



Average key figures per shift:

Bridging movements: 1.266

Overhead movements: 164

steps: 6.339

distance: 4.437 m

Handling bended
 Handling neutral
 Handling overhead

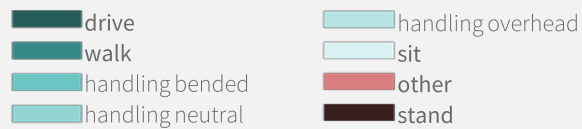
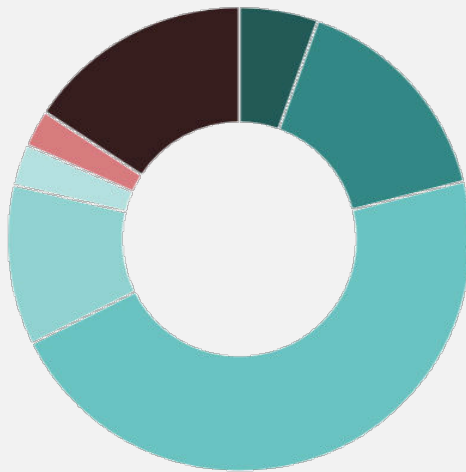


Data analysis

Various possibilities to filter and analyze the data

Activities per region

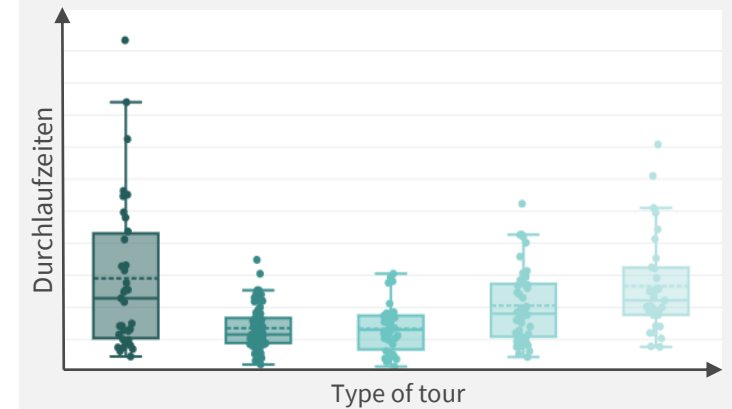
Activity distribution for the region packaging



Iterative Heatmap



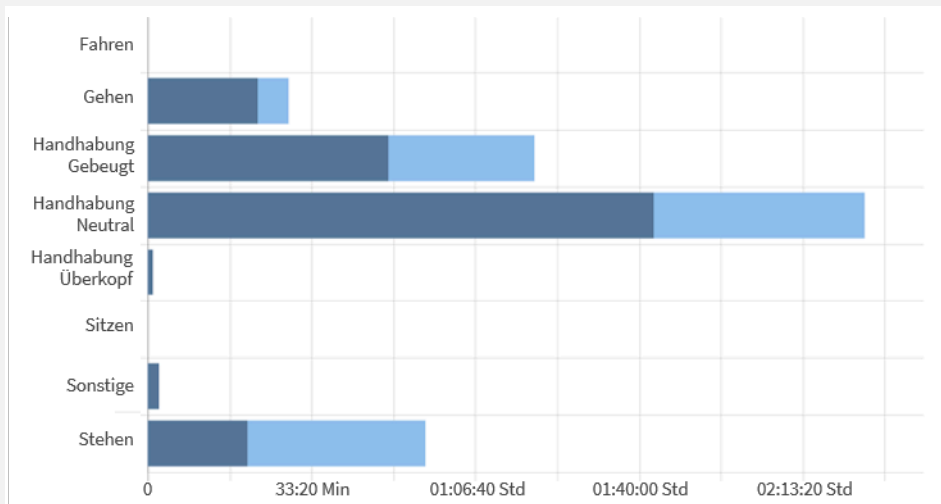
Statistical evaluations



Key figures

Detailed activities automatically determined for tools, trolleys and vehicles

tools/ trolleys



Average key figures per shift:

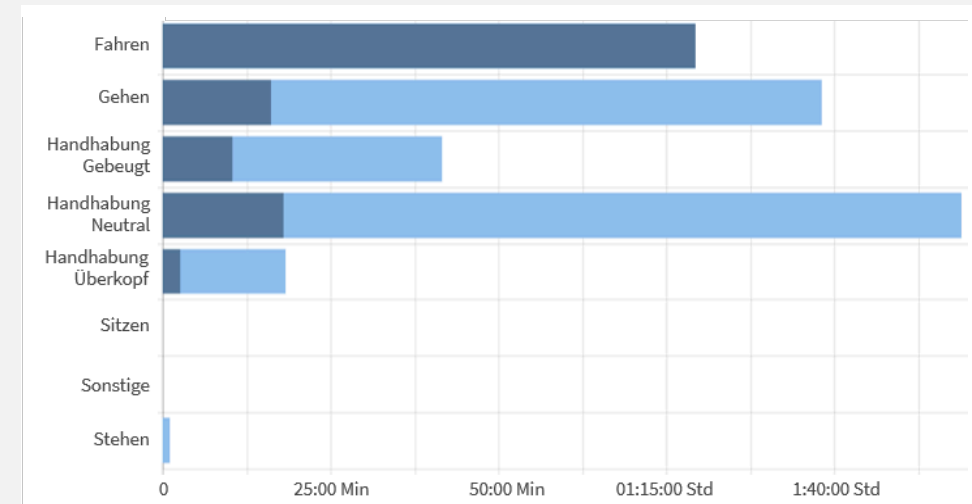
■ In use ■ Nearby

Share in overall process: **69,7%**

Number nearby: **600**

Number of in use: **381**

vehicles



Average key figures per shift:

■ In use ■ nearby

Share in overall process: **38,2%**

Number nearby: **356**

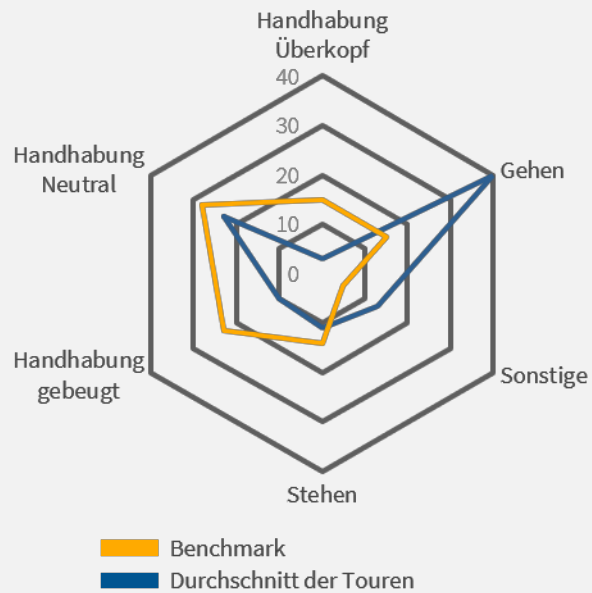
Number of in use: **223**

In Depth Analyses

Future functions of the platform

Network charts

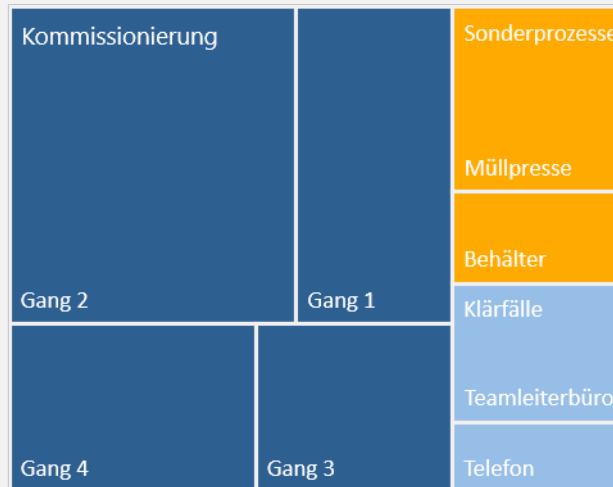
Aktivitätenverteilung im Vergleich [in %]



Treemaps

Regionsverteilung

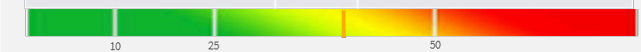
■ Kommissionierung ■ Sonderprozesse
■ Klärfälle



Further analyses

Leitmerkmal Methode

Kategorie	Wert	Begründung
Lastwichtung	1	Geringe Last <10 kg einer einzelnen Handhabung
Körperhaltung	4	Schlechte Körperhaltung, tiefes Beugen,
Ausführungsbedingungen	1	Gute Ausführungsbedingungen, keine Hindernisse, ebener rutschfester Boden, ausreichend beleuchtet
Summe	6	
x Zeitwichtung	6	Frequenz von 368 Bewegungen gemessen
Belastungsbeurteilung	36	Wesentlich erhöhte Belastung



Matching mit Auftragsdaten





Recognize and Improve Ergonomics and Workflows

Examples of our identifying capabilities

Posture



neutral standing



good and bad lifting posture



overhead handling posture

(...)

Movements



walking



carrying



driving



cleaning

(...)

Exposure Periods



second evaluations



regularities

Repetitions and Vibrations



repeated movements



vibrations

Exemplary Use Cases

Previous Motion-Mining projects (1/2)

Inbound



Storage



Order Picking



Packing



Outbound



A/B-Tests



Exemplary Use Cases

Previous Motion-Mining projects (2/2)

Maintenance



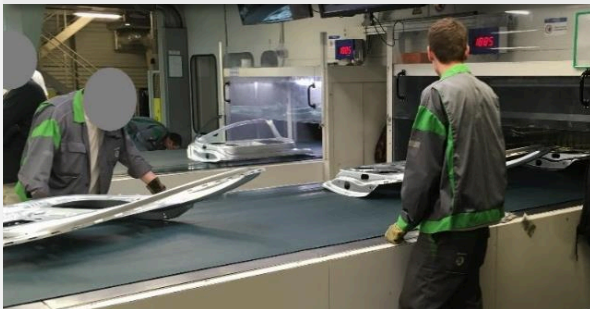
Production



Setup



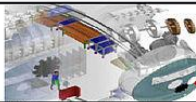
Quality Control



Control Processes



MTM-Supplement

Projekt		Erstellt modest Suhl Bearbeiter				
Aufgabe		Halle Datum Sonntag, 13. September 2015 Druck 10.27.21				
1 Teile einlegen FUGE-Matrix PROKON_1.mtx GREIF-Matrix PROKON_1.grp						
Lfd	Handlung	Symbol	Zugriff	ges. Zeit	Symbol	Handlung
1	Vorspiel mit Baugruppe	R25A	1		#S2	Übungsgrad mittel
2	Masse 0 [g]	G1A	1	14,1		
3	über MoVo	M25A	1	31,5		
4	Einsetzen	M5B	1	36,0		
5	Spannen mit Fuß	LM	1	43,1		
6		RL1	1	45,1		
7				0,0	Wn	<<<< Warten 1,5 [s] >>>>
8	zu	R39Am	1	54,7	1	R39Am zu
9	ZYLINDERSCHRAUB	mRSC	1	58,4	1	mRSC ZYLINDERSCHRAUB



Use Case: BUNZL

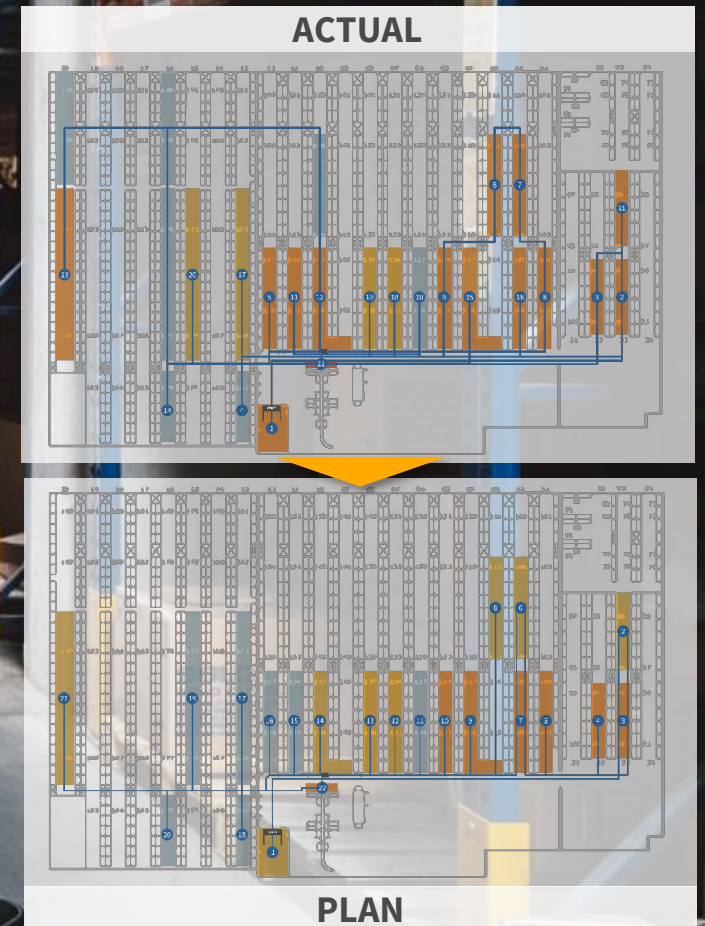
Hidden efficiency potential of 40% were revealed



BUNZL

savings p.a.:

- ~ 200,000 € (path strategie)
- ~ 55,000 € (problem cases)





Achievements

Testimonials



"As a result of the MotionMiners project in our ECOM logistics centre, it was possible to identify weak points in the area of warehousing and significantly increase efficiency. In the course of this project, different order picking trolleys were compared in terms of ergonomics and the most effective order picking trolley was determined."

~ Rainer Schmid
Head of Logistics DC E-Commerce
Hugo Boss AG



Achievements

Testimonials



"We do not leave anything up to chance. This not only applies to our products and system solutions, but also to our internal workflows and logistics processes. With MotionMiners, we had a trusted partner at our side when it came to process analysis and optimization in Europe's most modern logistics center for industrial supplies. From the uncomplicated planning and as-is analysis to the smooth progress of the project and the identification and implementation of optimization potentials: a goal-oriented and partner-like cooperation".

~Helmut Eisenkolb
Head of Logistics Department
Würth Industrie Service GmbH & Co KG



Achievements

Testimonials



"The Motion-Mining® technology enables us, as process consultants, to offer new analysis possibilities for process optimization."

fischer Consulting was convinced not only by the richness and quality of the data, but also by the possibility of conducting ergonomic evaluations of workstations and process systems.

A perfect symbiosis for optimising processes and ergonomics. And at the same time with a modest utilization of resources, something which in the past could not be determined nearly as well by means of close process observation.

With the MotionMiners team, we have an innovative partner who reacts quickly to our needs, provides excellent support and, with the MPI platform, offers us a well-founded analysis option for our customers".

~ Jan Greschner
Head of Sales & Marketing
fischer Consulting GmbH



MotionMiners GmbH

At a Glance



Sensors

Hardware development (sensors),
Software and firmwares for sensors,
Production and Maintenance,
Mobile applications

Dr.-Ing. Sascha Feldhorst



Analysis

Plattform development (MPI)
Data analysis: platform and custom
evaluations for projects

Dr.-Ing. René Grzeszick



Sales & Projects

Project and product sales,
Consulting projects,
Support for product customers

Sascha Kaczmarek



Achievements

We are proud of our accomplishments

Business References – Consulting Service



Business References – Product Solution (MPI)



Awards



Investorensicht



2nd year in a row:
MotionMiners is among the top
6% of the 3000+ startups
evaluated by Early Metrics



**We look forward to
working together!**

Stay in Motion