

»Blockchain for Industrial Applications«

Trends, Challenges & Chances

*"I guarantee you –
Blockchain will play an
important role in every
company"*

Achim Berg
President of Bitkom

*"We don't believe that traceability is the goal.
We believe that transparency is the ultimate
goal. Blockchain will give us the ability not
only to track where food came from, but how
it was produced."*

Frank Yiannas
Vice President of Food Safety at Walmart

Join the consortium to ...

gain an understanding of the **technologies** behind the trend and learn to evaluate relevant **use cases**:

- Get an overview of **application fields outside of cryptocurrencies** like healthcare, logistics, automotive, machine and plant engineering, pharmaceuticals, chemistry, etc.
- Identify **specific applications** that are relevant for your company like **fraud prevention, release of specific features and elimination of unwanted counterfeits**
- Evaluate the **technological and economical challenges and chances** behind the industry trend

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Initial Situation

- Blockchain, Tangle or related** technologies are told to be revolutionary - the “new internet” - which could **solve** current **issues related to digitalization and globalization**. Starting in the financial sector the hype spills over in multiple other industries, leading to many open questions:
- What are the **opportunities** behind this technology and what are new fields of application?
 - What are the potential **implications** for my markets, sector, business unit and team?
 - What are the **challenges** of relevant and developing technologies?

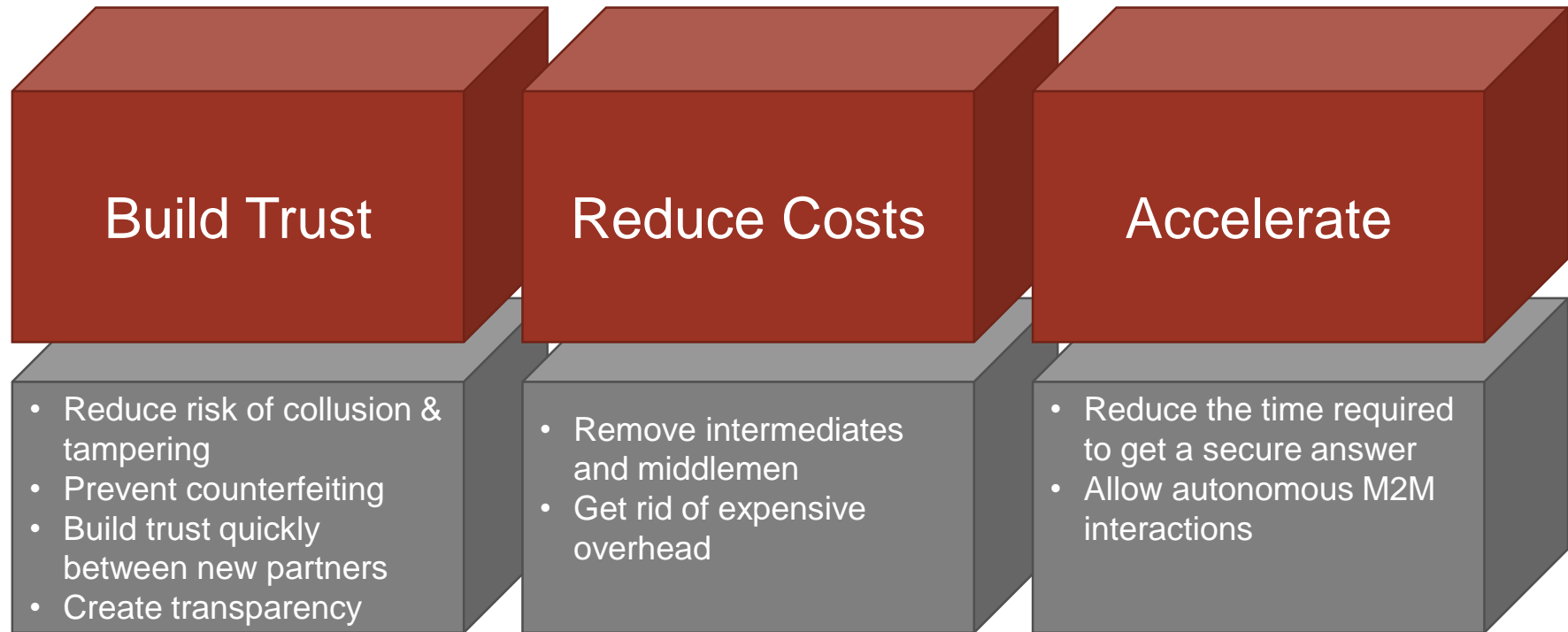
Procedure

- Starting point is an **overview** and **SWOT** analysis to create a **general understanding** of the technologies and their potential impact on selected application fields
- **Best practice applications, high potential applications based on partner needs** and **research applications** will be structured and offered for further evaluation
- Based on your vote, a **deep dive on technological and economic aspects** will be executed for selected applications

Major Outcome for Participants

- ➔ Understanding the concepts of blockchain technologies and the implications for your business
- ➔ A detailed overview of current and future blockchain and tangle applications, underlying enabling technologies, software tools and enabling partners
- ➔ Technological and economical evaluation of potential implementation of selected cases
- ➔ Access to a large cross-industrial & interdisciplinary partner network

Potential of Blockchain / Tangle Usage



Source: IBM Watson IoT

Potential Focus Areas

Smart Production



Production
Data Handling



Supply Chain
& Logistics

...

Smart Products



Product
Transparency



Product Data
Handling

...

Smart Services & Processes



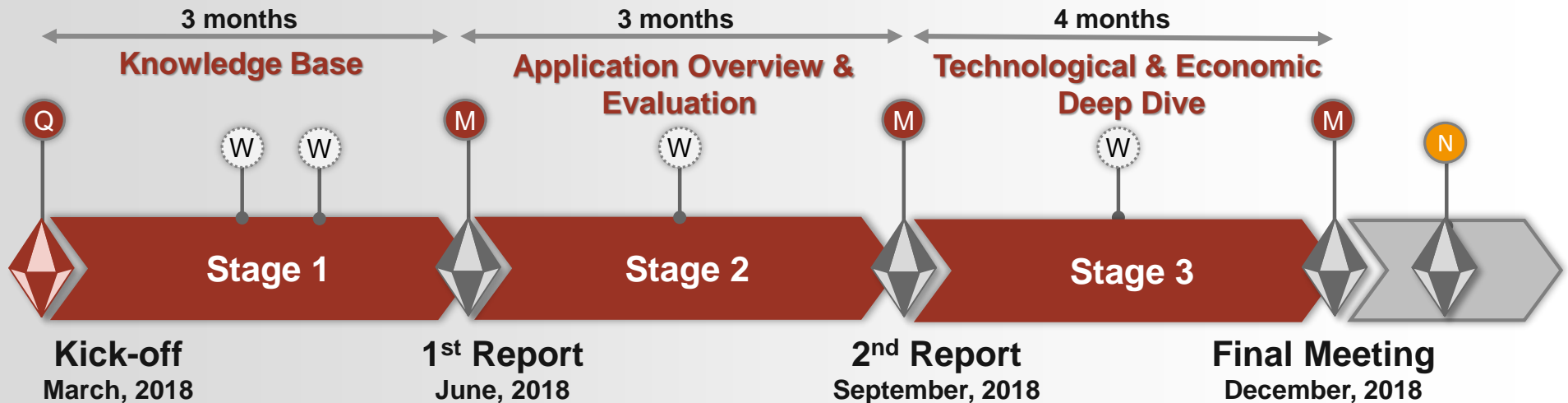
Smart
Contracts



Collaboration
Platforms

...

Project Structure & Timeline



Stage 1 Content:

- Development of a **structured and detailed knowledge base**
- Internal and external **expert input** regarding different underlying technologies like **blockchains** and **tangle**
- **Segmentation** of different application fields and target markets
- ➔ *Information for a **common understanding and profound basis***

Stage 2 Content:

- Assessment of most relevant **use cases, best practices and research activities** within the derived segments
- **Technical** and **economic** evaluation in terms of short fact sheets
- Assessment of **potential collaboration partners &** solution providers
- ➔ *Information basis for selection of **relevant detail cases***

Stage 3 Content:

- **In depth technological or economic analysis** of defined use cases according to the partners needs
 - Technological **implementation**, to develop a **roadmap** and define stage gates
 - Assessment of potential **added value, costs for implementation or business model generation**
- ➔ *Information basis for subsequent partner-specific **roadmaps/decisions** concerning the initiation of specific **monitoring, demonstration or implementation projects***

Project Framework

Market Perspective

Technology Perspective

3

How do I **evaluate** the **economical** potential of a blockchain solution?

How can I **establish** the right **network** of partners for leveraging the potentials?

Deep Dive

Are there existing **solutions** for my **problems** and how are they working in detail?

What are the **technological differences** between various approaches and what is the **most suitable** for my use case?

2

For which of my **business needs** is a blockchain applicable?

Which other **applications** exist based on **markets** and **focus areas**?

Structured Overview

Which applications could **disrupt** my **current business**?

How do I **identify** research entities, start-ups & collaboration partners for the implementation?

1

How do I **implement** gathered **data** in a blockchain / tangle?

What **infrastructure** do I need to setup in my company?

Knowledge

What kind of Distributed Ledger Technologies (DLT) exist **beside blockchain**?

Are there **best practice examples** of blockchain / tangle usage in my field of application?

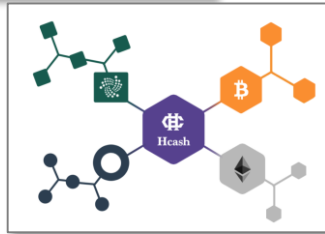
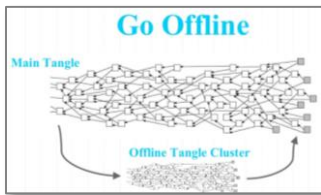
Exemplary Proceeding & Results

Stage 1: Segmentation & Knowledge Base

1

2

3



Knowledge Base

- Build up **background knowledge** regarding **blockchain-based** or **blockless** systems like directed acyclic graph/ tangle and **hybrid systems**
- Understand the differences and advantages of different distributed **consensus methods** like proof of work, burn, capacity, stake, activity, etc.
- Generate a common **understanding & discuss relevant issues** with the consortium partners

Segmentation

- **Structured overview** of branches where the different technologies could be beneficial
- Possible **fields of application and general concepts** like smart contracts, “long data”, trace (food) contamination, verification of software updates, etc.

→ *Consortium votes for the most relevant segments based on partners' needs and interests. Applications dedicated to these selected segments will be assessed in Stage 2.*

Segmentation

Logistics & Supply Chain

Logistics & Supply Chain Segment Summary

Segment Description:

Suggested sub-segments:

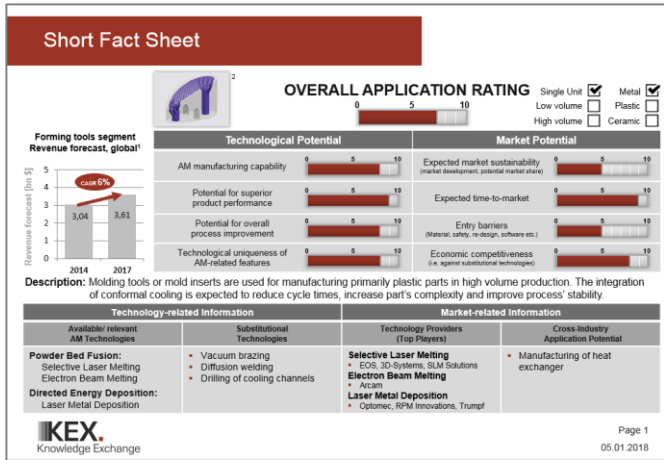
- Counterfeit prevention
- Tracing and product history
- Real time end-to-end visibility
- Smart contract trading

KEX Knowledge Exchange

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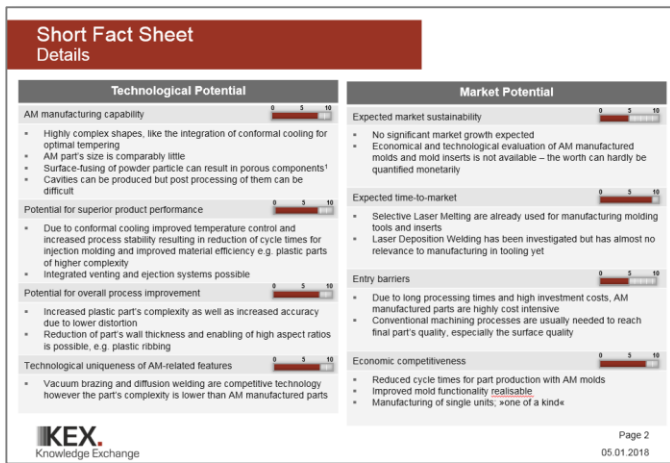
Exemplary Proceeding & Results

Stage 2: Application Short Fact Sheets



Technology & Market Analysis

- Scouting for **relevant** blockchain **applications**, already in **use or under research** within the selected focused areas
 - **Structured overview** of best practices, concepts and solutions that are already in use or under development
 - Analysis of the application on a **technical** level:
 - What type of **distributed ledger technology** (e.g. Blockchain), **consensus mechanism** (e.g. proof of work), etc. is used and why?
 - Assessment of the **market** potential:
 - What is the market potential or are there possible synergetic uses?
 - Identification of **cooperation partners** like suppliers, key researchers or business partners
 - Identification and **discussion of challenges** to cope with, as basis to define a **roadmap**
- ➔ *Consortium votes for blockchain applications to be further deeply evaluated in Stage 3*



*Exemplary extract of a technological and ecological short fact sheet

Exemplary Proceeding & Results

Stage 3: Technology or Business Case



Technology Case

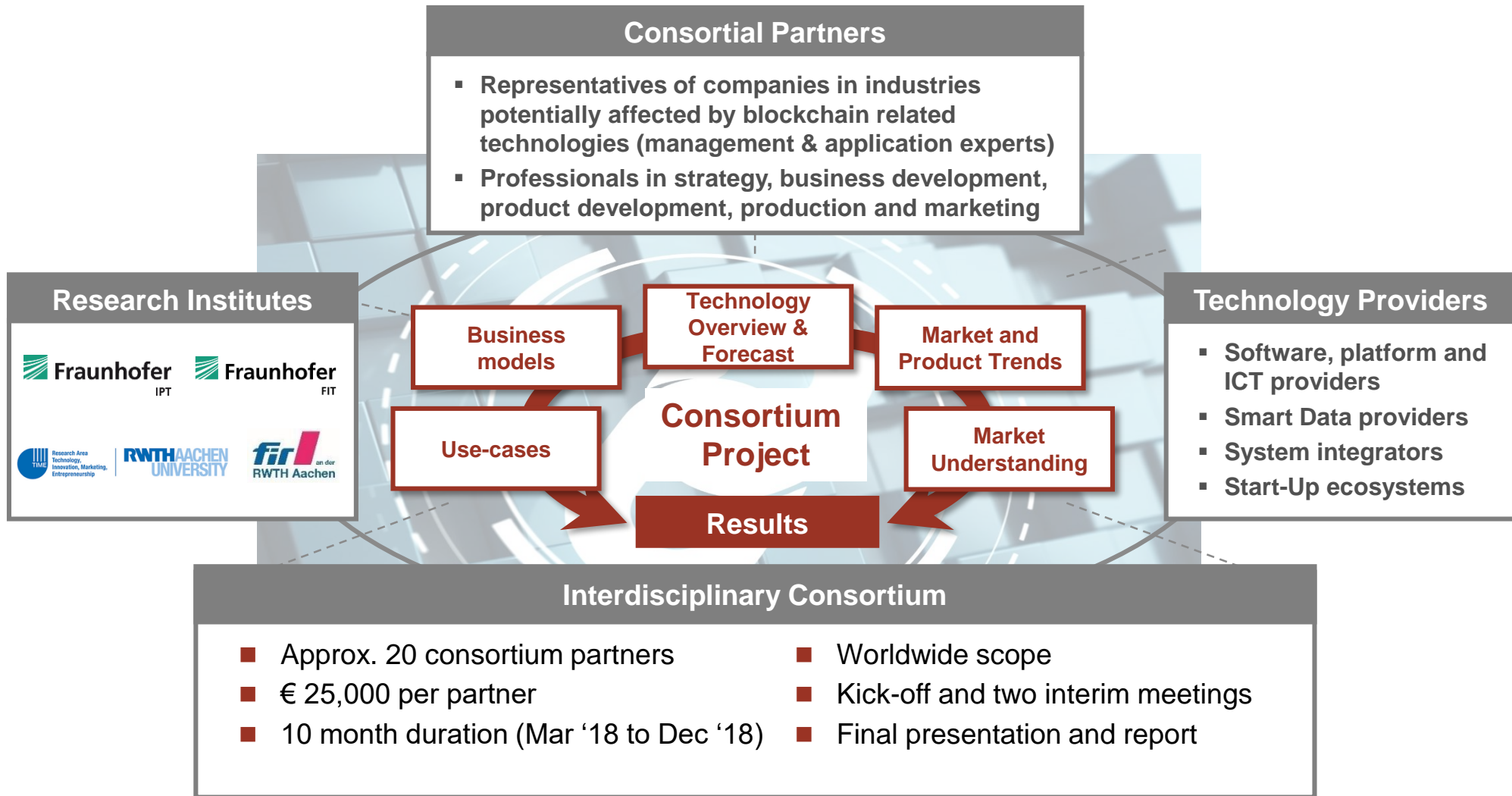
- In depth **technological assessment** of different concepts their advantages & challenges regarding the specific application
- **Implementation or development roadmap** to define stage gates and **identify key players** to talk to
- In depth analysis of a possible example use case **from development to roll out**

Business Case

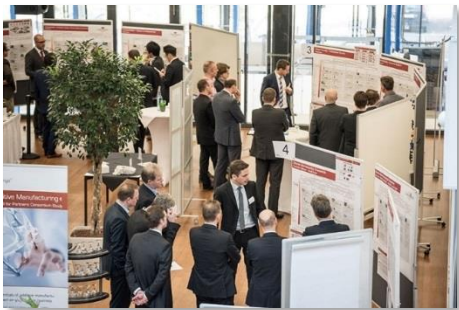
- Evaluation of a possible business case regarding **implementation costs and ROI**
- **Comparison** of different solutions and concepts **regarding their technological and market potential**
- **Overview and suggestion** regarding possible development **strategies** within the defined scenario like wait and buy up or becoming an innovation leader
- Assessment of potential new **Business Models**

*Exemplary extract of a technological deep dive named technology case

Consortium Structure

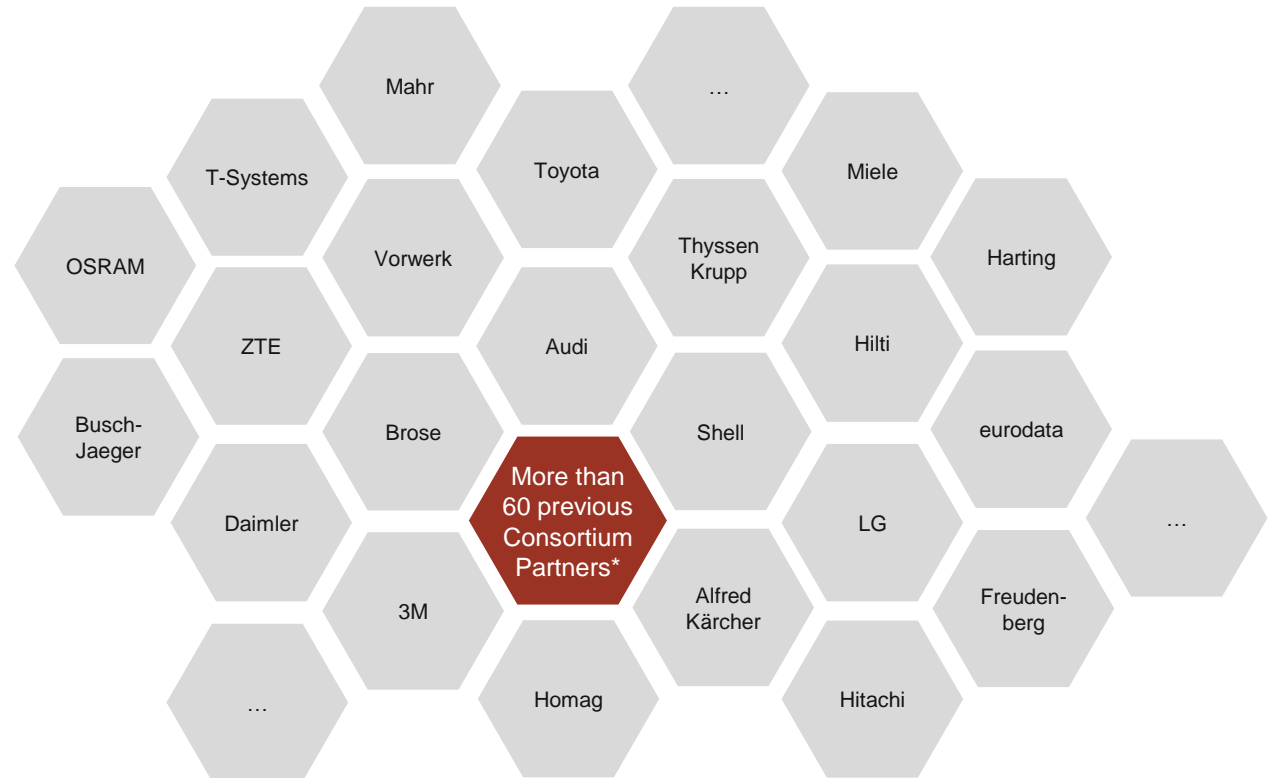


Project References



Consortial Project Framework:

- **Result generation by research partners** (TIME Chair RWTH, FIR, Fraunhofer IPT & FIT)
- **Face-to-face results presentation and discussion** with industrial consortial partners
- **Moderated cross-industrial workshops and expert key note speeches**
- **Networking with a cross-industrial consortium and highly relevant research entities**

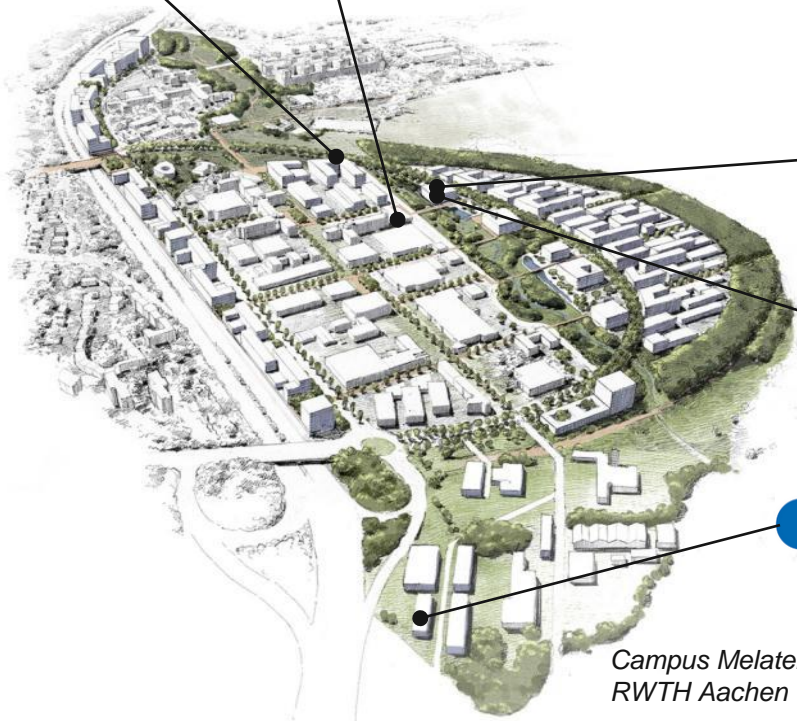


Involved Institutes and Companies

A Powerful Team in Technology Research

 **Fraunhofer**
IPT

 **KEX.**
Knowledge Exchange®



 **fir**
an der
RWTH Aachen

 **DEMOFABRIK**
AACHEN


 **TIME**
Research Area
Technology,
Innovation, Marketing,
Entrepreneurship | **RWTHAACHEN**
UNIVERSITY

Campus Melaten
RWTH Aachen University


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Expert Network in Aachen:

 **Fraunhofer IPT**

- Knowledge and experience in all fields of production technology for developing and optimizing solutions for modern production facilities


 **TIME Chair RWTH Aachen**

- Technology and innovation management
- Business model innovation

 **DEMOFABRIK AACHEN**

Demonstration Factory Aachen


- Application, exploration and further development of Industrie 4.0 solutions with industrial and research partners

 **fir**
an der
RWTH Aachen

FIR - Institute for Industrial Management at RWTH Aachen

- Industry-oriented research in the areas service, information and production management

Additional Experts:

 **Fraunhofer FIT**

- For about 30 years now Fraunhofer FIT has been conducting R&D on user-friendly smart solutions that blend seamlessly in business processes

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