Digital Industrial Platforms & Ecosystem

…perspectives of a digital transformation

15. Dezember 2021
Prof. Dr. Uwe Wieland

One motivation perspective - automotive industry is changing.

Key changes to the product …

Electrification
More options by brand,
greater charging network

Connectivity
Always connected,
the ultimate endpoint

Autonomous
Greater capabilities,
steady (if slow) progress

Shared
Variety of modes,
consistent user experience

… driving us to re-think production.

Manufacturing
Increased efficiency across all domains (Production & Supply Chain)

From the voice of the customer…

connected platform

„As **shop floor responsible** I need a secured, scalable and connected hybrid environment to cover different types of data and use cases”

condition based maintenance

“As **maintenance technician** I want to rate my technical equipment within a defined state to assess the condition in order to increase the overall availability.”

process transparency

“As **process engineer** I want to leverage my (operational) data in order to understand my process and find weaknesses.”

real-time capable KPI systems

“As **equipment engineer** I want to be able to online calculate KPIs such as OEE and statistical process control in order to ensure process stability.”

…to an requirements framework lead by an case study approach.

Human & Organization	Technology/Applications	Cross-Cutting/ Hygiene Factors
- digital strategy - IIoT and industry 4.0 awareness - continuous competence development and training - efficient operations and system support - agile and interdisciplinary project organization	- track and trace & process transparency - real-time capable KPI systems - intelligent assistance systems - condition based maintenance - integrated object recognition - intelligent plant & tool management - matrix production & additive manufacturing - virtual asset commissioning - intelligent autonomous transport systems	- machine networking M2M communication - uniform communication standards - digital twins - integrated (microservice)-oriented platform - central app store - cloud-based platform - audit-proof data exchange
change management & platform governance	**IIoT applications**	**Digital Industrial Platform**

perspectives of a platform ecosystem*!

consumers

consuming and utilizing the core value from the platform ecosystem

Examples: maintenance technician, process engineer, …

producers

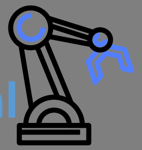
providing the core value to the platform ecosystem

Examples: condition based maintenance, real-time capable KPI systems, …

IIoT applications

change management & platform governance

Digital Industrial Platform



partners

are additional service providers looking for a better and broader market access, only indirect involved into the exchange of core values

Examples: hyperscaler (e.g. AWS, Microsoft, Siemens) payment providers

platform owner

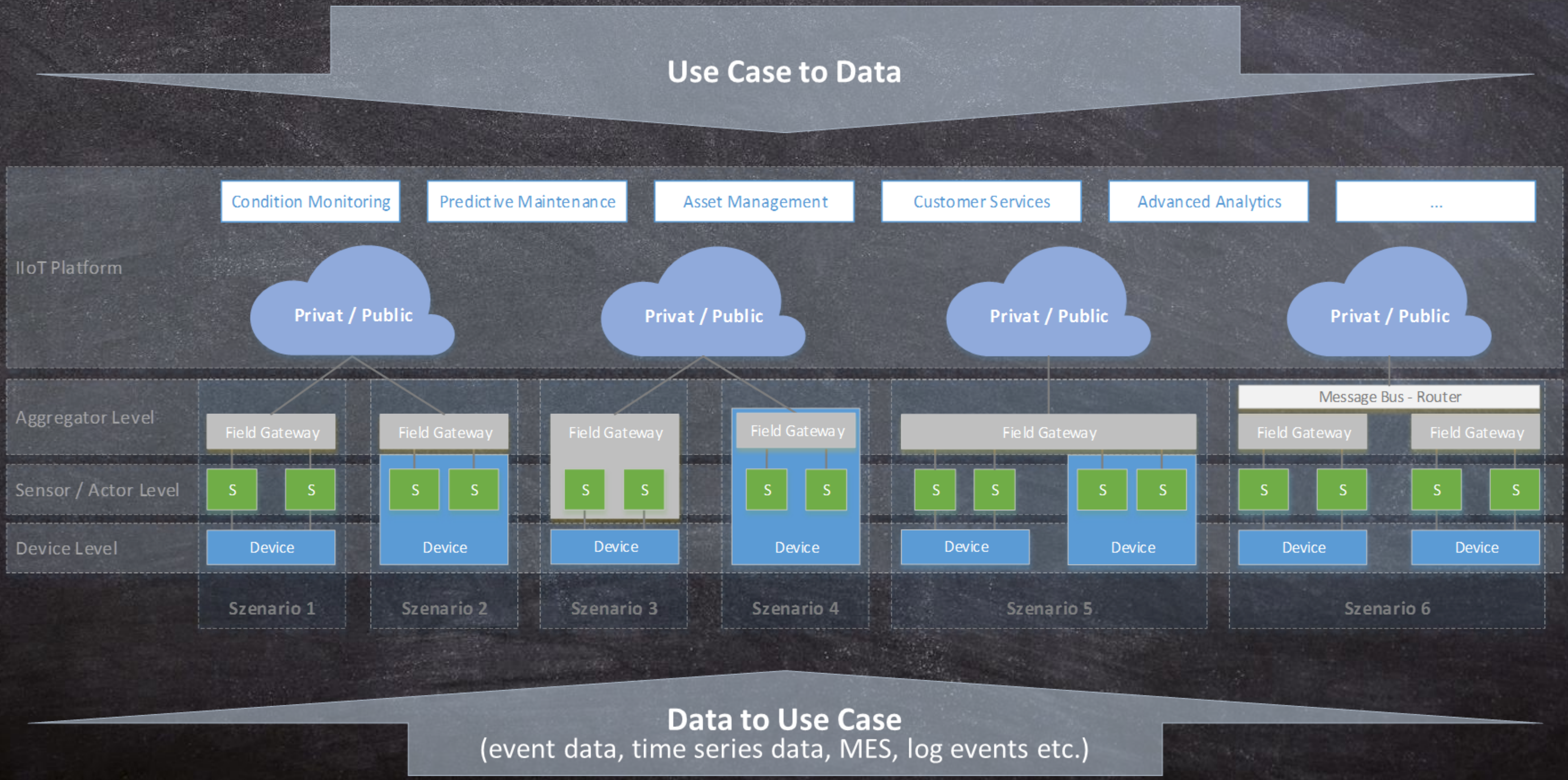
own the vision of the platform & ecosystem, are responsible to lower the friction of core platform processes and to enhance the experience of the platform for all stakeholders

Examples: Digital Production Platform, Open Manufacturing Platform, …

*[PIK V3.0]

Perspective: Digital Industrial Platforms

The Architectural & Organizational Complexity of Digital Industrial Platforms…



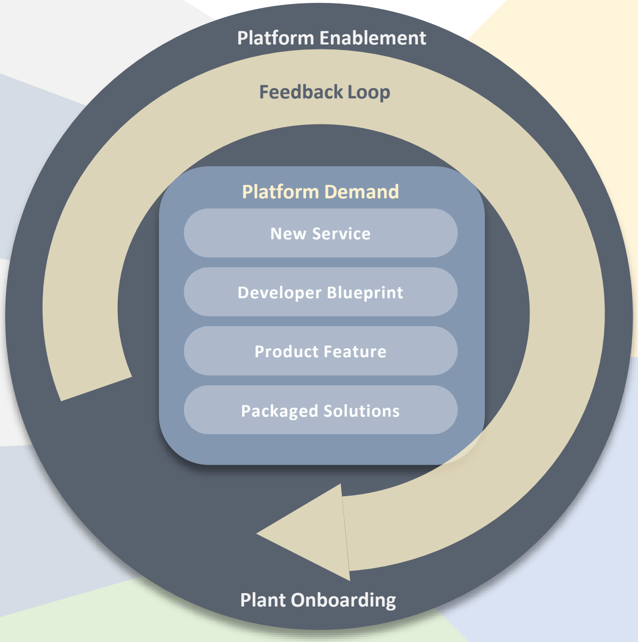
Digital Industrial Platforms – Capabilities & Use Case Interaction

Focus Use-Cases
These are promoted initiatives from the strategic product portfolio that address a group-wide scalable business benefit

Partner Use-Cases
These are promoted initiatives involving strategic partners that create together a group-wide scalable business benefit

Independent Use-Cases
These are smaller initiatives supported and financed independently by brands and plants

Exploration & Discovery
These are Quickstarter Kits or Sandbox Accounts provided to potential customers free of charge for exploration



Developer & Admin Tooling

Account & Landing Zone Management
Customer account/LZ provisioning and management, Application Authentication & Authorization

Application Management & Marketplace
Marketplace to Produce, Share and Consume applications and costs across plants. Fly-wheel effect for platform-at-scale.

Data Connectivity

IT-System Connectivity & Management
Simple access and access control to existing data sets (IT systems)

Device Connectivity & Management
Connecting machines, devices and gateways. Storing and managing device and asset information.

Data Catalog

DPP Plant Infrastructure

Plant & Edge Computing
On-premise extension of the Cloud in plants

Enablement Packages

Blueprints (for Developers)
Serverless, EKS and Data Lake (new blueprints are generated from work streams through working by doing).

Quick Starter Kit (for End Users)
Allows exploring cloud services free of charge for a limited period

Product Management

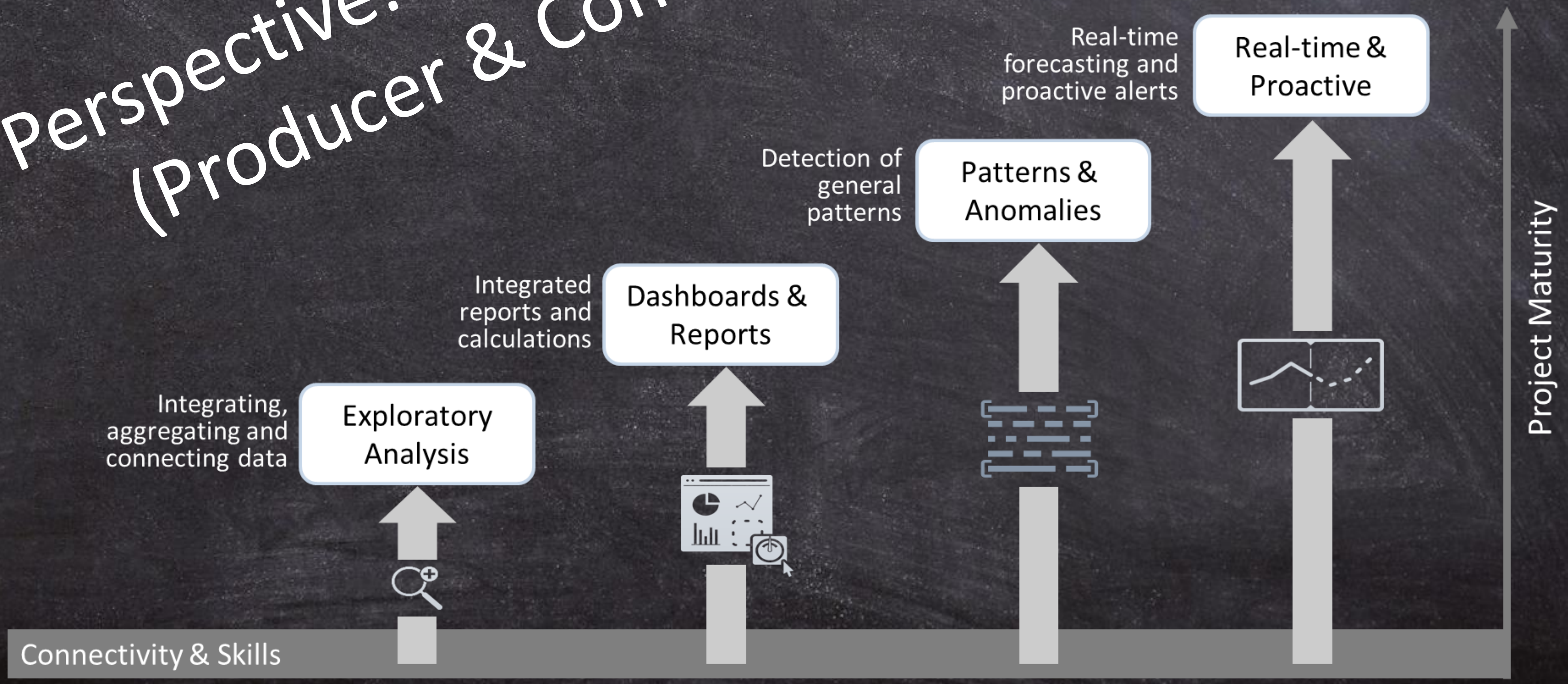
Operations

Security

Brand, Plant, Partner - Standard Implementations
Use of standard cloud and digital industrial platform services with no platform demand, e.g. migrations, modernizations, refactoring, cloudification

Customer Journey

Perspective: IIoT applications (Producer & Consumer)



Transformation to Industrial AI – **on the way of democratizing AI and robotics**

Optical inspection is one of the tasks that exists in every automotive factory at multiple stages and today is **mainly performing by humans or stationary, automated solutions**.

A car in production has usually more than **800 different inspection points at various positions**.

Thus, it is an **extremely expensive application case** that has the potential to scale significantly across the automotive OEMs.

TODAY

Inspection is mainly done manually

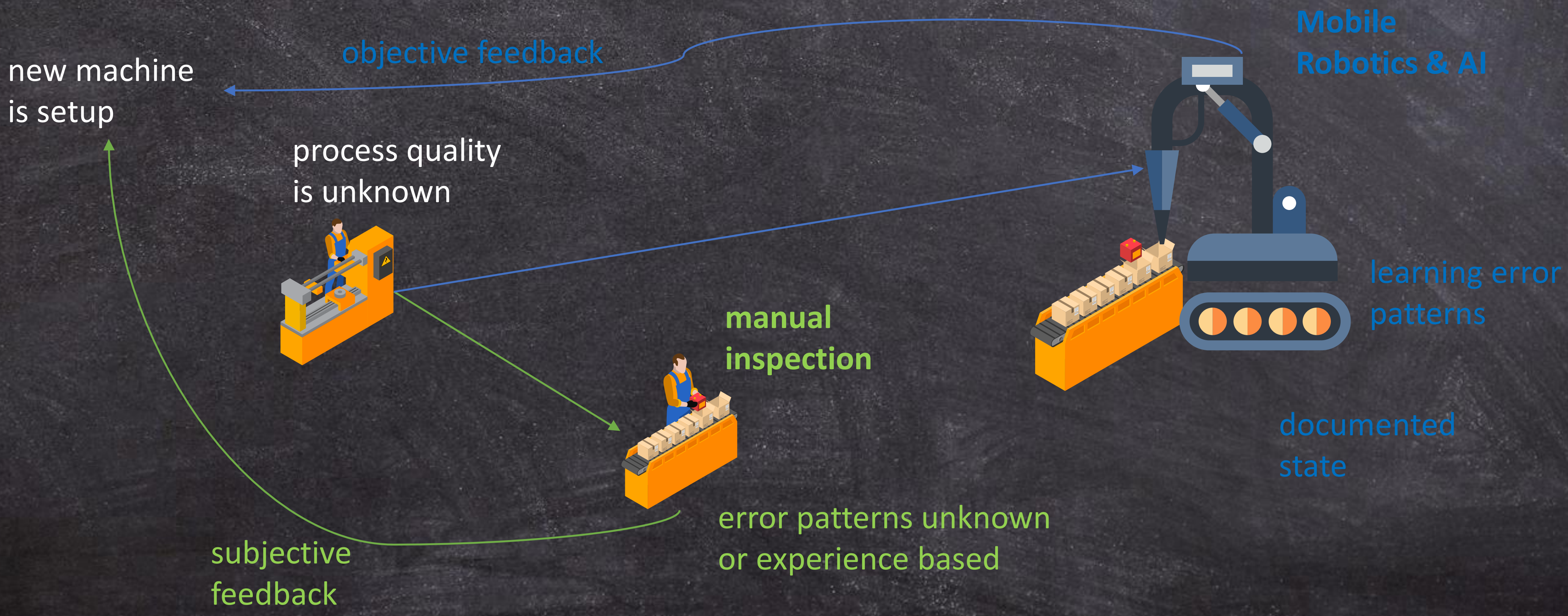
Pro	Cons
flexible	error prone
easy to train	expensive
	hard to scale

AUTOMATED Solutions are mainly stationary

Pro	Cons
high quality	inflexible
standardization	expensive
	hard to maintain

Persona: Process Ramp-Up Manager

User Story: “I have to ramp up my assembly process fast, stable & documented.”



Our Goal: Reduction on monotonous, exhausting and error-prone work. Savings on manual labour.

MVP – best of both worlds!

no code robotics & AI from Data Scientist ;)

Next iteration –
no code robotics & **<u>no code AI</u>**

…on the way of democratizing AI and robotics!

challenges & research motivation …

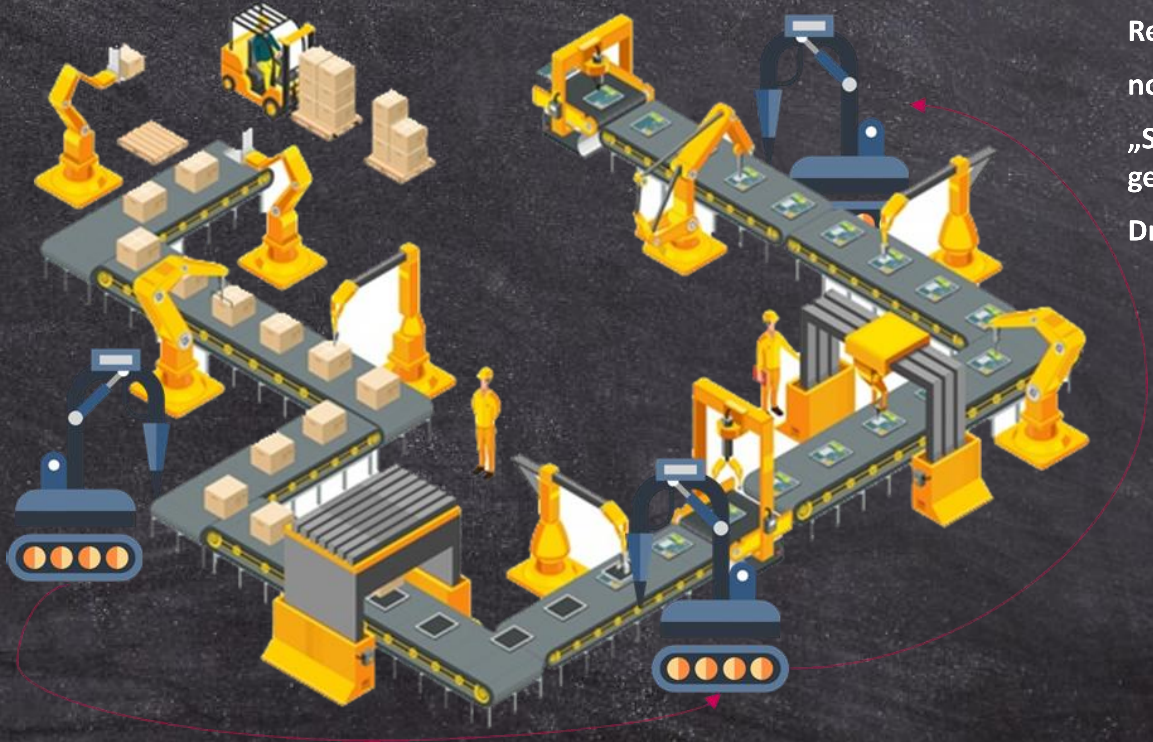
- **Smaller batch sizes, shorter production cycles and new manufacturing techniques which require more agile and automated approaches**

+

- **A lack of implementation specialists (e.g. data scientist) leading to an increasing number of optical inspections done manually**

- **Increasing demand of highest quality standards due to customer, documentation and legal requirements**

- **Long ramp-up time, high costs, low scaling and flexibility**



Research example

no code AI + no code robotics:

„Sächsische Unternehmen entwickeln gemeinsam einen mobilen „Robospector“

Dresden/Chemnitz 23.09.2021

Veröffentlicht am 23. September 2021

Roboter wird zum Qualitäts-Inspektor

von Heiko Weckbrodt

Voransicht des Robospector. Abb.: Siemens WKC

Perspective: Change Management & Platform Governance

Technology is only one point of view – real world check!

	Human	Technology	Organisation
Method	Case Study: Shopfloor Management for Operator	Action Learning: Shopfloor Connectivity	Case Study: Change of working processes
Actual Situation	Manual and analog system	Heterogeneous equipment in one line	Manual established processes and information cascades
Target Situation	Real-time visualization of machine capacity and machine status	Consolidated data input and construction of a first visualization	New system has to be released for the process
Risks	Data without manual evaluation in advance ("false positives")	Access to systems via different network layers, security restrictions, etc.	Handling of errors in the measurement system, wrong interpretation, etc.
Impact(s)	Optimized operational workflow	Higher data quality and less time spent on data collection	Faster and more precise KPI reporting over the different plant layers

Wrap-up
“perspectives of a platform ecosystem”

perspectives of a platform ecosystem

technology is only one point of view and not more important than change management & governance!

	Human	Technology	Organisation
Method	Case Study: Shopfloor Management for Operator	Action Learning: Shopfloor Connectivity	Case Study: Change of working processes
Actual Situation	Manual and analog system	Heterogeneous equipment in one line	Manual established processes and information cascades
Target Situation	Real-time visualization of machine capacity and machine status	Consolidated data input and construction of a first visualization	New system has to be released for the process
Risks	Data without manual evaluation in advance ("false positives")	Access to systems via different network layers, security restrictions, etc.	Handling of errors in the measurement system, wrong interpretation, etc.
Impact(s)	Optimized operational workflow	Higher data quality and less time spent on data collection	Faster and more precise KPI reporting over the different plant layers

IIoT applications are modular, encapsulated functionalities that complement the platform benefits!

Technology/Applications

- track and trace & process transparency
- real-time capable KPI systems
- intelligent assistance systems

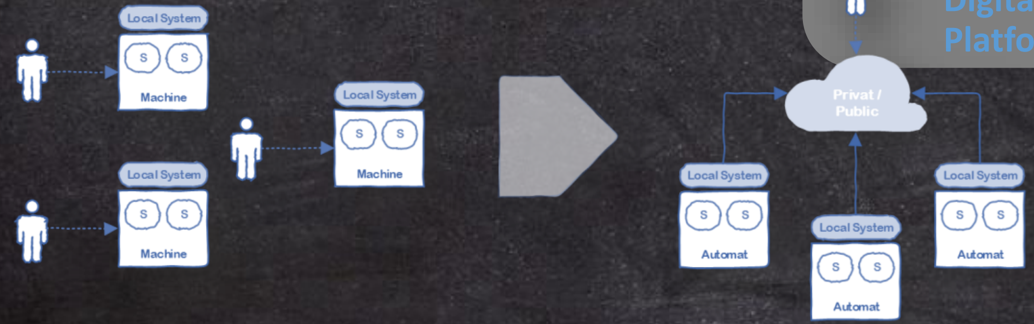
- condition based maintenance
- integrated object recognition
- intelligent plant & tool management
- matrix production & additive manufacturing

- virtual asset commissioning
- intelligent autonomous transport systems

IIoT applications

change management & platform governance

Digital Industrial Platform



partners are very important & indispensable, but pay attention to the balance of the dependencies!

architectural complexity caused by heterogeneous connectivity types & data!

Dr. Uwe Wieland

Researcher & Coach Industrial IoT/
Operational Excellence, Executive Advisor D...

Literature and further resources.

Digital Industrial Platforms

Tobias Pauli · Erwin Fielt · Martin Matzner

Received: 18 December 2019 / Accepted: 7 December 2020

Keywords Digital platform · IIoT platform · Platform ecosystem · Marketplace · Business-to-business · Internet of things · Industrial internet of things · Industry 4.0 · Manufacturing

1 Introduction

With digitalization ongoing, there is no end in sight for the advance of the platform economy (Parker et al. 2016) as platforms and distributed innovation are among the main trajectories for digital innovation (Yoo et al. 2012). Within the information systems field, the primary type of platforms studied are digital, software platforms, that is, "the extensible codebase of a software-based system that provides core functionality shared by apps that interoperate with it, and the interfaces through which they interoperate" (Tiwana 2014, p. 7). Besides established domains for digital platforms such as enterprise software and mobile communication, many other domains are currently undergoing "platformization". In their efforts to implement Industry 4.0, an increasing number of industrial firms are establishing their own digital platforms, such as Siemens' MindSphere, General Electric's (GE) Predix, or Bosch's IoT Suite. However, these industrial incumbents are not the only ones venturing into the market of digital industrial platforms. Platform- or Infrastructure-as-a-Service (PaaS/IaaS) providers such as Amazon Web Services (AWS) or Microsoft Azure are also moving into the manufacturing domain, offering their own platforms or providing infrastructure, services, and technologies to other platforms.

Digital industrial platforms act as both innovation and transaction platforms (Cusumano et al. 2020). First, they allow for the collection and analysis of data from a variety of industrial assets and devices, ranging from tools and machines to vehicles or whole warehouses and factories. This data is usually made available to an ecosystem of third-party firms, who can build complementary solutions such as industrial applications and services. Second, many of the platforms offer marketplaces to facilitate the distribution and use of the created applications to a large market of industrial customers. Thus, digital industrial platforms are an important building block for Industry 4.0, which has been affecting the manufacturing industry for the past few years (Lasi et al. 2014). Currently, however, firms are facing significant challenges in their establishment (Marx 2020).

While (digital) platforms in general have been a prominent topic in BISE research, the rise of digital industrial platforms raises some new, important questions: What are the key characteristics of these platforms? How are they similar or different to other kinds of platforms, in particular as studied in the information systems discipline? What are the implications for research and practice, in particular the BISE research community? In this catchword, we provide tentative answers to these questions

Accepted after two revisions by Ulrich Frank.

T. Pauli · M. Matzner (✉)
Chair of Digital Industrial Service Systems, Friedrich-Alexander-Universität Erlangen-Nürnberg, Fürther Straße 248, 90429 Nuremberg, Germany
e-mail: martin.matzner@fau.de

T. Pauli
e-mail: tobias.pauli@fau.de

E. Fielt
School of Information Systems, Queensland University of Technology, 2 George Street, Brisbane, Australia
e-mail: e.fielt@qut.edu.au

Published online: 12 January 2021

Computers in Industry 101 (2018) 1–12

Contents lists available at ScienceDirect

Computers in Industry

journal homepage: www.elsevier.com/locate/compind

ELSEVIER

The industrial internet of things (IIoT): An analysis framework

Hugh Boyes*, Bil Hallaq, Joe Cunningham, Tim Watson

Cyber Security Centre, WMG, University of Warwick, Coventry, CV4 7AL, UK

ARTICLE INFO

Keywords:
Industrial internet of things
Cyber-physical systems
Industry 4.0
IIoT
IACS

ABSTRACT

Historically, Industrial Automation and Control Systems (IACS) were largely isolated from conventional digital networks such as enterprise ICT environments. Where connectivity was required, a zoned architecture was adopted, with firewalls and/or demilitarized zones used to protect the core control system components. The adoption and deployment of 'Internet of Things' (IoT) technologies is leading to architectural changes to IACS, including greater connectivity to industrial systems. This paper reviews what is meant by Industrial IoT (IIoT) and relationships to concepts such as cyber-physical systems and Industry 4.0. The paper develops a definition of IIoT and analyses related partial IoT taxonomies. It develops an analysis framework for IIoT that can be used to enumerate and characterise IIoT devices when studying system architectures and analysing security threats and vulnerabilities. The paper concludes by identifying some gaps in the literature.

1. Introduction

The concept of Industrial Automation and Control Systems (IACS) is well established. These systems, often referred to as Operational Technology (OT), are employed in diverse industries including manufacturing, transportation and utilities, and are sometimes referred to as cyber-physical systems (CPS). Since the term Internet of Things (IoT) [1] was first used in 1999, it has been applied to connected devices in consumer, domestic, business and industrial settings [2]. Although there is a significant amount of literature attempting to define IoT, its uses, and its typical components, it is rarely made obvious how any of this applies in the industrial setting.

Because current definitions of IoT invariably imply a similar approach to the high-level architecture of a system, the ubiquitous use of the term IoT to refer to the use of digital technologies in industry is unhelpful as it hinders the analysis of alternative system architectures, including the location and nature of the data or information processing, and associated performance and security issues. The aims of this paper are to improve on existing definitions of Industrial IoT (IIoT) and to propose a framework for IIoT components as a basis for analysing the use and deployment of IoT technologies in industrial settings. In undertaking this research our aim was to establish a framework that allows us to analyse the nature of IIoT devices and their uses, which is to be used as part of a vulnerability and threat analysis process for these devices. By being able to characterise the devices in a systematic manner, we anticipate being able to analyse cross-cutting threats and vulnerabilities and identify patterns that may be obscured when focusing on the technology employed or sector specific issues.

This paper is structured as follows: Section 2 provides some further background to CPS, IACS, and the Industrial Internet, setting it against the background of Industry 4.0. Section 3 provides our analysis and definition of IIoT, which builds on existing explanations that are presented. Section 4 presents our framework. Finally, Section 5 identifies gaps in the current literature that need to be addressed in future work

2. Background

Whilst researching IIoT we have reviewed a wide range of academic literature and found that when combining the search terms:

("Industrial Machines" OR "Industrial Systems") AND "Internet" OR ("Industrial Internet") AND "Machines"

The following terms were amongst those most regularly found:

Cyber Physical Systems (CPS), Industrial Control Systems (ICS), Supervisory Control and Data Acquisition (SCADA), and Industrial Internet.

Although not an exhaustive list, it does represent the most commonly used terms in both academic and relevant non-academic literature, for white papers and corporate blogs. In the rest of this section we define Industry 4.0 and review the above terms before moving on to develop our definition of IIoT and the taxonomy.

Drei Strategien zur Etablierung digitaler Plattformen in der Industrie

Einige digitale Plattformanbieter wie Apple, Google oder Facebook realisieren im Konsumgüterbereich beispiellose Wettbewerbsvorteile. Auch produzierende Unternehmen erkennen zunehmend das Potenzial, ihren Kunden neben physischen Produkten plattformbasierte Dienstleistungen anzubieten. Dies verlangt jedoch eine deutliche Veränderung des Geschäftsmodells: Als Plattformanbieter tritt das Unternehmen nicht mehr allein als Lösungsanbieter auf, sondern bündelt das Leistungsangebot vieler Unternehmen für seine Kunden. Dieser Artikel beschreibt drei Strategien, mit denen produzierende Unternehmen ihren Weg in die Plattformökonomie ausgestalten können. Ausgehend von der Annahme, dass das Unternehmen bereits als Lösungsanbieter auftritt, stellen wir diese Strategien vor und benennen konkrete Anwendungsbeispiele, die eine Formulierung eigener Strategien inspirieren können.

Hedda Lüttenberg, Daniel Beverungen, Martin Poniatowski, Dennis Kundisch und Nancy V. Wünderlich

Wirtschaftsinformatik & Management
https://doi.org/10.1365/s35764-021-00324-z

Published online: 11 March 2021

Literature and further resources.

LEVERAGING INDUSTRIAL IOT PLATFORM ECOSYSTEMS: INSIGHTS FROM THE COMPLEMENTORS' PERSPECTIVE

Research paper

Pauli, Tobias, FAU Erlangen-Nürnberg, Nürnberg, Germany, tobias.pauli@fau.de

Marx, Emanuel, FAU Erlangen-Nürnberg, Nürnberg, Germany, emanuel.marx@fau.de

Matzner, Martin, FAU Erlangen-Nürnberg, Nürnberg, Germany, martin.matzner@fau.de

Abstract

To create value from the increasing amount of data produced by the Industrial Internet of Things (IIoT), many firms establish platforms to collect data and make it available to third parties. Thus, IIoT platforms rely on a diverse ecosystem of complementors for value creation. While platform ecosystems have received considerable attention in research, most studies focus on the platform owner and domains such as video game or mobile platforms. In this article, we conducted a case study to shed light on why complementors choose specific IIoT platforms and how they leverage IIoT platform ecosystems for their benefit. To this end, we collected interview data from 15 firms that provide complementary offerings to an IIoT platform. We identified platform owner relationship, platform owner background, customer decision, platform market position, and platform features as vital criteria for platform choice. Additionally, our findings show that complementors leverage IIoT platforms primarily as a technological basis for individual solutions but not as a marketplace for generic applications. Our study extends research on platform ecosystems by illuminating the complementors' perspective and adding insights from the IIoT domain. Additionally, our findings provide guidance for platform owners on how to design IIoT platform business models and facilitate leverage.

Keywords: Industrial Internet of Things, Platform, Ecosystem, Complementor, Leverage.

1 Introduction

As exemplified by Amazon, Microsoft or Apple, platforms constitute a significant trajectory of digital innovation (Yoo et al., 2012). In recent years, industrial firms have started to move towards platform business models as well. Fueled by the increasing prevalence of the Industrial Internet of Things (IIoT), the created platforms ease the collection and processing of data from various industrial assets and facilitate data-driven services (Hodapp et al., 2019b). The success of platforms is based on the concept of leverage, i.e. *"generating an impact that is disproportionately larger than the input required"* (Thomas et al., 2014, p. 206). This refers to their characteristic of acting as a technological basis for complementary solutions and their role as a market intermediary between different groups of actors (Gawer, 2014).

While suppliers enable the production of a good, complementors enable its use (Adner and Kapoor, 2010). In the case of IIoT platform ecosystems, for example, these actors provide software applications (apps) to analyze and use the generated data. As a result, digital platform business models depend heavily on an ecosystem of complementors (Teece, 2018; Parker et al., 2017). In the case of IIoT platforms, the ecosystem becomes even more relevant as the technical complexity of the IIoT, as well as the business-to-business (B2B) context, require a more diverse set of actors for value creation (Schermuly et al., 2019; Hein et al., 2019c). With the growing number of IIoT platforms, the key differentiating factor will

Proceedings of the 54th Hawaii International Conference on System Sciences | 2021

From Suppliers to Complementors: Motivational Factors for Joining Industrial Internet of Things Platform Ecosystems

Christian Marheine, University of St.Gallen, christian.marheine@unisg.ch

Tobias Pauli, FAU Erlangen-Nürnberg, tobias.pauli@fau.de

Emanuel Marx, FAU Erlangen-Nürnberg, emanuel.marx@fau.de

Andrea Back, University of St.Gallen, andrea.back@unisg.ch

Martin Matzner, FAU Erlangen-Nürnberg, martin.matzner@fau.de

Abstract

Spurred by the internet of things, industry firms are increasingly establishing platforms that animate an ecosystem of external actors to provide complementary offerings. But why do independent firms decide to join these ecosystems and to become complementors? The goal of this study is to disentangle their motivational factors in the context of the industrial internet of things. A theoretical framework is developed a priori based on the knowledge-based view of the firm and complementary logics. The framework is empirically explored using a case study design. Our results indicate that financial, technology, and knowledge gains positively influence the decision of complementors to join the ecosystem. Yet, our interviews reveal relative differences in motivations based on complementors' uncertainty. Our findings contribute to the research on joining nascent digital platform ecosystems from a complementor perspective and the growing stream of research on industrial internet of things platforms.

1. Introduction

Digital platform ecosystems have seen considerable growth during the past years [1], recently especially in the industrial internet of things (IIoT) domain [2]–[4]. IIoT platforms, like technology or innovation platforms [5], [6], shift the locus of innovation from within the firm to an ecosystem of independent third-party firms—so-called complementors. They develop technical artifacts on top of a platform and become innovators for its owner. Prominent examples like Siemens' MindSphere or PTC's ThingWorx empower firms to (1) connect and manage various devices, (2) store and analyze data in a cloud, and (3) develop additional IIoT services, such as predictive maintenance, on top of the platform to serve different industry verticals [7]. But why do firms decide to join these platform ecosystems and to become complementors? Which factors influence their decision? Are there variances in aspirations between different types of complementors or IIoT-specific ones?

In this study, we refer to a firm's decision to join an IIoT platform ecosystem as becoming part of a group of firms (i.e., complementors) that focus parts of their business activities on developing and commercializing technical artifacts associated and compatible with the platform as the core technology [8], [9]. Complementors leverage the platform by increasing technological variety that, in turn, serves the value propositions of others and raises technology adoption [1], [10], [11].

So far, prior information systems (IS) literature has mainly examined the impact joining had on the firm performance of complementors with proxies like sales [9], [12], [13]. If these effects studied equal the expectations complementors had before joining, they offer good indications on the motivational factors that caused their decision to join a priori. Accordingly, most studies have reported that gaining access to the platform's customer base is the strongest incentive to join [9], [14], [15].

However, we see three gaps that make it worthwhile to conduct this research. First, scholars have not provided many insights from the complementors' perspective [16]. Second, most studies focus on complementors that are essentially software developers (e.g., [9], [17]). Although this type of complementor is often found in consumer platforms, it does not draw the full picture in complex domains such as the IIoT. In the latter, typical complementor roles involve manufacturing, connectivity, data analytics, and software providers [18]. We thus consider the IIoT domain as an interesting domain to learn more about the characteristics of complementors and platforms hoping that these insights may contribute to our innovation platform knowledge in general [5]. Third, while prior work has explored complementors' choice of specific platform ecosystems [11], we take a step back in this paper to uncover firms' motivational factors for becoming complementors in the first place.

URI: https://hdl.handle.net/10125/71341
978-0-9981331-4-0

The Generativity of Industrial IoT Platforms: Beyond Predictive Maintenance?

Paper-a-thon

Tobias Pauli, FAU Erlangen-Nürnberg, Nürnberg, Germany, tobias.pauli@fau.de

Yanpei Lin, The University of Queensland, Brisbane, Australia, yanpei.lin@uq.net.au

Abstract

As the Industrial Internet of Things (IIoT) increasingly connects various assets, firms are establishing platforms to harness the data and make it available to third parties to create complementary offerings. As a result, IIoT platforms possess high generativity, i.e. the potential of triggering a variety of innovations. However, little is known to date about how this generative potential is leveraged. Therefore, in this study, we analyzed the solutions provided via the IIoT platform of a large European industrial firm along two dimensions: the diversity of solution scenarios they address, and the diversity of capabilities they display. Our preliminary results indicate that the diversity of scenarios addressed by IIoT solutions is quite high, whereas the diversity of capabilities is mainly limited to monitoring. Our study provides empirical insights on the generativity of IIoT platforms and extends the literature on digital platforms by indicating that generativity might require a more differentiated analysis.

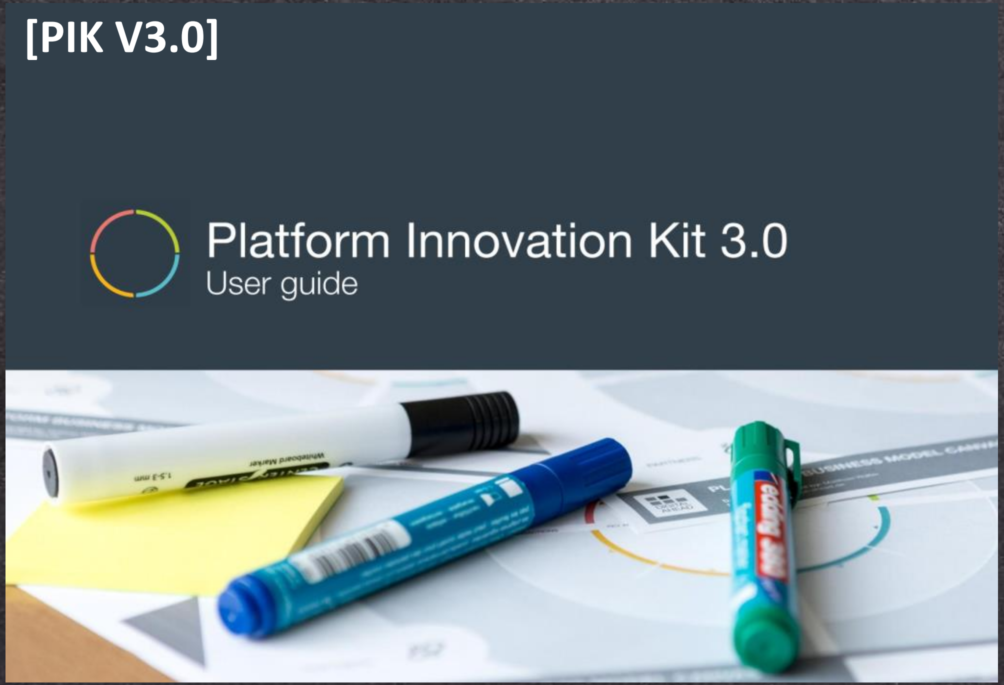
Keywords: IIoT Platform, Digital Platform, Generativity, Industrial Internet of Things.

Introduction

In line with the advent of the *Industrial Internet of Things* (IIoT), many firms are creating platforms to collect data from industrial assets and make it available to third parties. Viewed from a technological perspective, platforms enable the creation of solutions by others (Gawer 2014). Thus, it is at the heart of platform business models to leverage the innovation capabilities of complementors (Parker et al. 2017; Thomas et al. 2014). As a result, digital platforms and their surrounding ecosystems are often associated with the notion of *Generativity* (Hein et al. 2019), defined as "a technology's overall capacity to produce unprompted change driven by large, varied, and uncoordinated audiences" (Zittrain 2006, p. 1980). Generativity is not only linked to digital platforms, but digital innovation in general, as the nature of digital or smart products allows for the creation of new value propositions without having to physically change the product (Yoo et al. 2010).

IIoT platforms enable the collection and use of data from various kinds of assets and devices from wearables to ships and power plants. The most frequently mentioned example for new market offerings enabled by this is predictive maintenance (e.g., Kiel et al. 2017; Weking et al. 2018; Wortmann and Flüchter 2015). However, various other ways of using the capabilities of smart machines and the IIoT are conceivable (Atzori et al. 2010; Sisinni et al. 2018). As the generativity of a digital platform is increased by the heterogeneity of components that can be integrated with and added to it (Yoo et al. 2010), IIoT platforms possess high generative potential. Nevertheless, research on how this generative potential manifests in practice is still scarce. Therefore, in this paper, we conducted a single case study using online data to answer the research question "How do actors leverage the generative potential of IIoT platforms?". In this process, we analyzed a total number of 102 application solutions provided on a large European industrial firm's IIoT platform. To operationalize the construct of generativity, we assessed the application solutions regarding

Literature and further resources.




Association for Information Systems

AIS Electronic Library (AISeL)

ICIS 2020 Proceedings | IoT and the Smart Connected World

Dec 14th, 12:00 AM

Boundary Resources for IIoT Platforms – a Complementor Satisfaction Study

Dimitri Petrik
Graduate School of Excellence advanced Manufacturing Engineering, dimitri.petrik@gsame.uni-stuttgart.de

Georg Herzwurm
University of Stuttgart, georg.herzwurm@bwi.uni-stuttgart.de