

I/MHP

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Of Pilots and Multipliers – How IIoT Platforms Become Scalable



Introduction

IloT platforms – a core element of digital transformation

In the wake of current global developments, industrial enterprises are now, more than ever, faced with the challenge of establishing resilient, efficient and digitalized production and logistics processes. The continuing coronavirus pandemic and the conflict in Ukraine are adversely affecting the global economy and spawning uncertainty with regard to value chains, material availability and energy prices.

If companies are to remain competitive under such market conditions and, at the same time, expand their activities in the direction of new business models, the opportunities that digital transformation has to offer must be exploited. In production and logistics, there is potential to use an unprecedented depth of information and the resulting data volumes to enhance efficiency (internally) and to develop new revenue streams (externally).

But this requires an IT infrastructure that combines industrial enterprises' historically developed IT system landscape with the requirements of data-driven companies. Part of this development will also be the departure from a core element of Industry 3.0. We are, of course, talking about the automation pyramid. It is being replaced by flexible middleware, which provides a digital infrastructure for connecting terminal devices and machines into a cyber-physical system across locations and companies. In so doing, it is laying the foundation for data to be used in a way that adds value, based on service-oriented applications.

This middleware is referred to as "Industrial Internet of Things platform" (or "IloT platform" for short). Specialists estimates that, by 2025, approximately 50% of all industrial enterprises will use IloT platforms, while another 25% will acquire or build their own.

This assessment seems to be coming true at present. Across industries, automotive OEMs and suppliers, not to mention machinery manufacturers and technology companies, are implementing IloT platforms to lay the foundations for their digital transformation.

To do this, they need to have the right technical and business-oriented setup. But this is where most companies that are keen to create an IloT platform fail. Consequently, few IloT platforms scale successfully inside or even outside of an enterprise.

Scaling won't necessarily be a sure-fire success

Whether platforms are intended for use on market platforms such as Amazon or designed as IIoT solutions, platform scalability is the name of the game in every single situation. This is because platforms do not serve just one side of the market (e.g., the end customer), but always connect at least two or even two or even more market participants with each other. This gives rise to so-called cross network effects: The more use case providers offer their use cases¹ (e.g. a predictive maintenance app) on a platform, the more attractive the platform is for use case-seeking users. And conversely, the more use case-seeking users, the more attractive the platform is to use case providers.

However, in relation to production and logistics companies, it is apparent that the scaling of IIoT platforms is progressing more slowly than hoped. This is because the use cases provided often do not scale in practice, which means that the IIoT platform itself does not scale within its target market.

DEEP DIVE

Cross-side network effects

Cross-side network effects are a unique selling point of platforms and shouldn't be confused with same-side or indirect network effects which occur exclusively within one side of the market. They are the main reason for the exponential growth and therefore also what makes platforms so lucrative due to the close relationships between several sides of the market.

Note: Network effects can be both positive and negative. Platforms can grow exponentially and also shrink exponentially.

The concerned companies try to transform the scaling problems into a success story through short-term initiatives. This approach is usually too short-sighted. Such initiatives merely act selectively to treat the symptoms of a non-existent or inadequately described platform strategy.

A well-thought-out platform strategy is the basis for the sustainable scaling of IIoT platforms. When defining such a platform strategy, equal attention must be paid to technical and business-oriented considerations. The premises of "IT first" or "business first" do not lead to success here. Both perspectives have a strong influence on the scaling of the use cases on the platform (use case journey) and on the scaling of the platform in the target market (market journey).

As can be seen in Figure 1 (see following page), the platform strategy acts as the core element of the IIoT platform model.

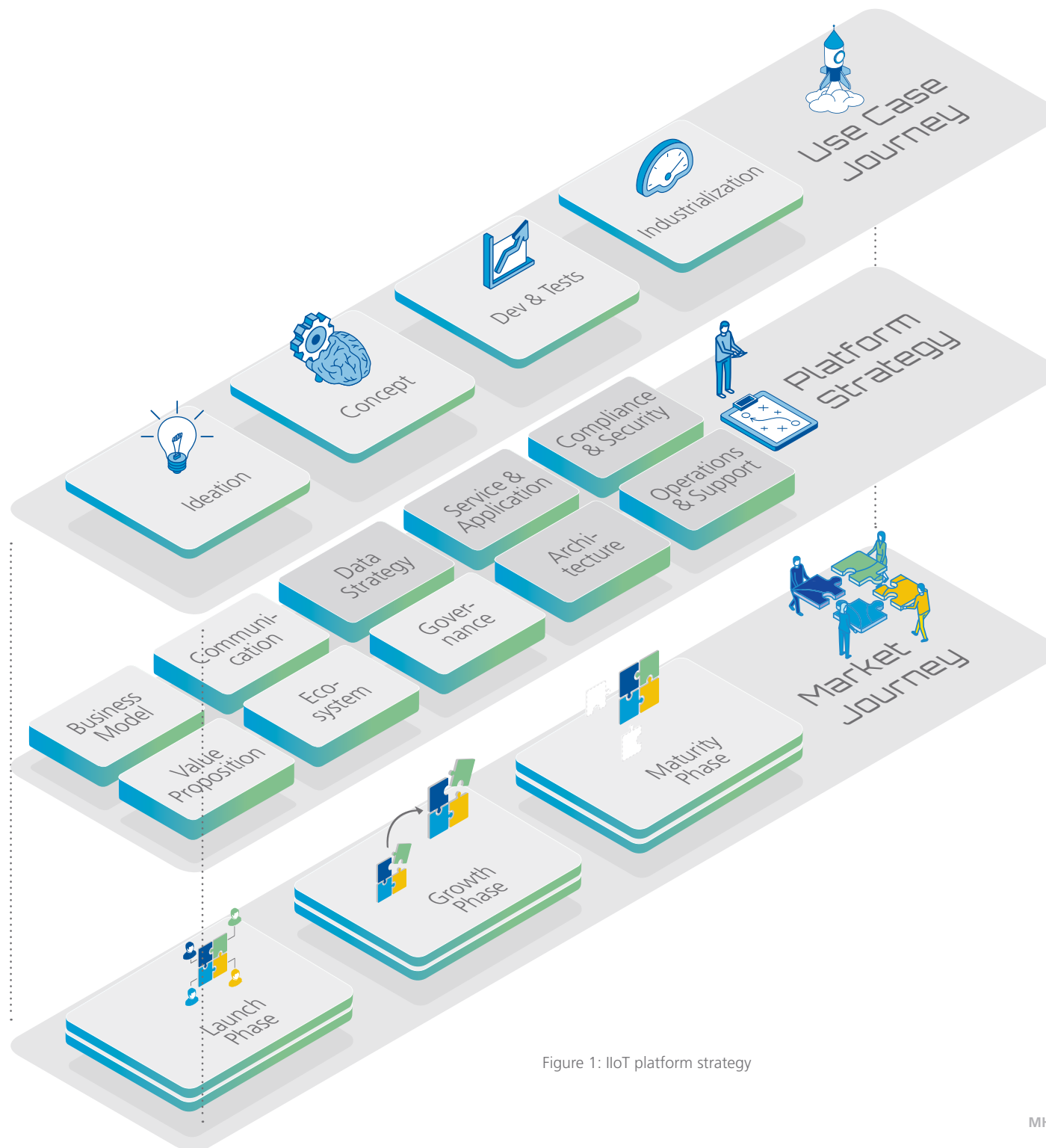


Figure 1: IIoT platform strategy

The platform strategy

From clusters, to fields of action, core elements and lead questions

Generally speaking, companies that use the IIoT platform have also defined a platform strategy. The understanding for the integration of the platform strategy into the IT or digitization strategy of a company already exists across all industries. However, the devil here is in the detailing and operationalization.

Take some time to consider a platform strategy you're familiar with: Is it explicit and clearly formulated? Does the platform's value proposition rigorously cater to a defined problem that people experience in the identified customer segments in the internal or external target market? Does the platform strategy enable data mining, data processing and, ultimately, value-added use of data from the entire target market? And does the platform strategy address how to handle heterogeneous system landscapes, data models and shop floor or terminal device hardware conditions? These questions can be further detailed at will, but they form exactly the basis that ultimately determines a

successful use case and market journey for the IIoT platform. It is advisable to make a distinction between business-oriented and technology-focused strategy clusters, so that all the necessary aspects of a platform strategy can be split into sections in a structured and methodical manner. None of the strategy clusters are superior to one another in this regard. However, the business-oriented considerations precede the technical ones, since they describe fundamental aspects such as the platform's core value proposition.

Within each of the strategy clusters, there are five strategic fields of action with various core elements that can be defined which are listed in Table 1. Each core element can be analyzed on the basis of specific guiding questions

Strategy cluster Business

Field of action	Core elements
Value proposition	Problem analysis Market prioritization Platform vision
Business model	Customer groups/ market sides Platform growth Monetization
Governance	Resources Operating model Legal/business compliance
Ecosystem	Partner management Openness/closedness Community management
Communication	Communication strategy/branding Feedback mechanisms Change management

Strategy cluster Technology

Field of action	Core elements
Data strategy	Data-based added value Data structure/sources Connectivity
Architecture	Cloud strategy Industry/technology standards Enterprise architecture mgmt.
Services and applications	Technology stack Deployment Innovation readiness
Compliance and security	Cybersecurity Data ownership
Operations and support	Location factors System stability

Table !: Strategy cluster

Use Case Journey

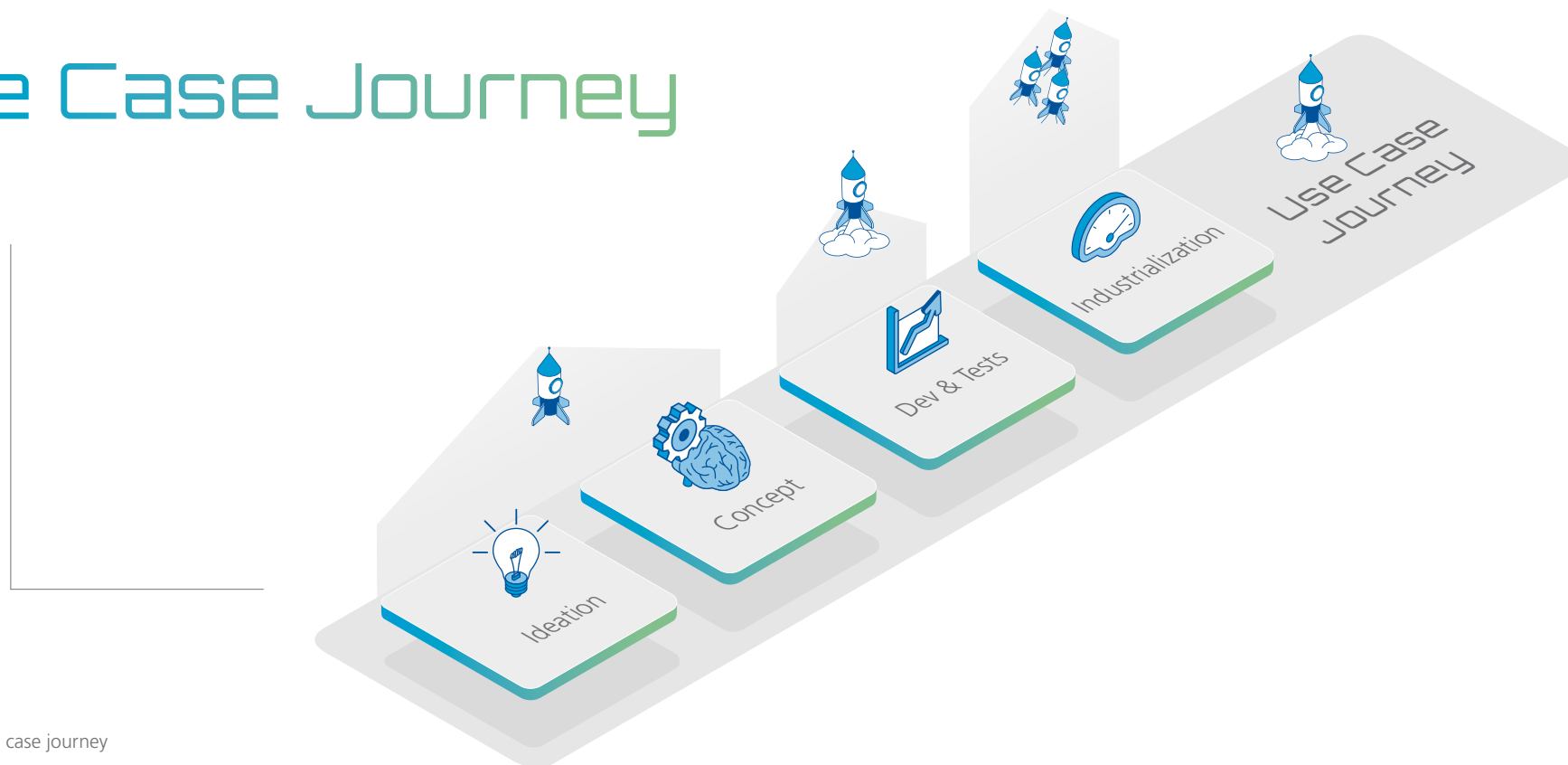


Figure 2: The use case journey

From the idea to the digital product

Every use case that is developed based on an IIoT platform goes through four phases, each of which represents a different level of use case maturity. These phases form the Use Case Journey, which is shown in Figure 2.

The ideation and concept phases are the starting point for use cases and ideally result in a proof of concept

(PoC) that can be tested and that provides an initial indication of the use case's feasibility, business benefit, requirements and profitability.

The subsequent development and testing phase uses the PoC as a starting point for developing and testing a minimum viable product (MVP) that can be successfully implemented in its productive environment.

The final phase (industrialization) defines the final use case maturity level through transformation from the MVP to the digital product. Unlike the MVP, the digital

product is a scaled software solution that has been implemented and made operational in several productive environments without extensive engineering efforts, and that also demonstrably delivers the use case's defined added value. Experience shows, that the transformation from MVP to digital product is the greatest is the greatest challenge within the use case journey. Causes and recommendations for action are explained in the chapter "Hands-on Platform Strategy" section.

The market journey

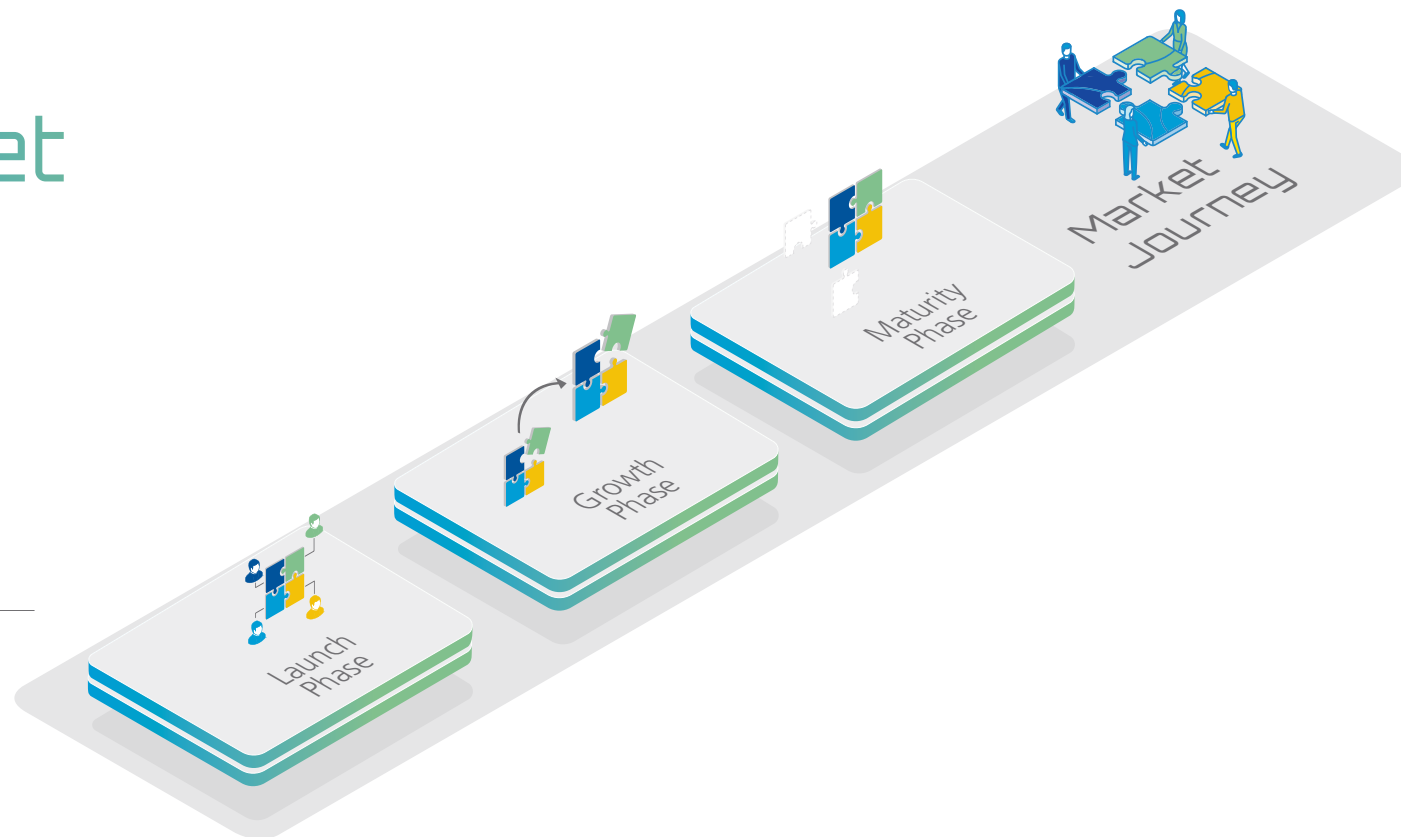


Figure 3: The market journey

To the target market and beyond

Unlike the use case journey, which represents use cases' development phases on the IIoT platform, the market journey (Figure 3) reflects the development phases of the entire IIoT platform on the target market.

The initial phase that every IIoT platform goes through at the start of its market journey is the launch phase, which is where a platform goes live and interacts with prioritized market sides for the first time. In this phase, the primary goal for the platform provider (a single

company or a consortium) is to analyze how the sides of the market interact and incentivize them as needed.

Only when there is a high match rate between the IIoT platform's different sides of the market (provider and user) will the trust in the platform's added value be established, which is vital for it to continue growing in terms of market penetration and market expansion. In the subsequent growth phase, the focus is on tracking and managing balanced platform growth in terms of market sides. In practical terms, this means that the number of users and service providers will increase proportionally to each other.

Once a platform has reached a healthy growth phase, the subsequent maturity phase shifts the focus away from the company's own platform and toward other technologies, some of which may be unfamiliar to the market. The focus is now on maintaining the platform's status in the target market through innovation, which is why the platform's functionalities and services have to be improved. Emerging trends must, as a minimum, be adapted. Ideally, they should be created by the company itself.

The market journey also poses significant challenges for platform providers, which are examined in chapter 3 in terms of their causes and mitigation.

Hands-on platform strategy

Complexity is not the same as hopelessness

While the platform strategy's clusters form the basic substance of successfully scaling the IIoT platform, in implementation it is the understanding of how the platform strategy, use case and market journey interact that makes this scaling possible in the first place.

Understanding the complexity of these relationships can enable decision makers at different levels of the IIoT platform to address their current challenges with informed analysis and concrete actions. Some such challenges are presented below. These are analyzed based on the strategy clusters and action items, as well as their impact on the use case or market journey. In addition, some best practices for mitigating these challenges are presented.

Challenge 1: Non-starters

Especially at the launch phase, platforms are often tested internally to begin with before the platform is made available to external users and service providers in the next market phase. Specialist divisions are integrated into the platform ecosystem in the form of both users and providers. For example, an existing problem is identified in the specialist divisions, a use case for solving this problem is developed by the IT department that works closely with them or in cooperation with a partner company, and the use case is then implemented.

Although enabling the specialist divisions is indeed a promising bottom-up approach, use cases such as these are often unscalable in practice and end up as non-starters within the Use Case Journey.. Negative outgrowths of such developments are use cases without added value outside of their specialist area, such as the migration of a local Excel VBA solution to the platform or the focus on site-/specialist area-specific processes and IT systems.

The consequence of such scenarios is the emergence of isolated solutions without any contribution to the scaling of PoCs to digital products, to the growth of the platform beyond the launch phase, or to the value proposition of the IIoT platform itself. Ultimately, only the provider of computing resources benefits from this approach.

Levers used in practice to solve the problem of pipe bursting are, for example, the creation of a committee-based operating model for the evaluation of use cases, exact checking of detailed use case business plans and the implementation of innovation centers for the user-oriented conception of use cases. It is rare that these approaches form a sustainable foundation for scalable use cases without diluting the bottom-up approach or significantly increasing the time and effort required to develop digital products. The real lever to prevent non-starters from occurring on an IIoT platform lies in the platform's strategy clusters that are relevant to this issue.

Non-starters

1. Value proposition

The value proposition is the central added value of the IIoT platform which it offers to the players in the target market. Each use case must make a contribution to this value proposition. To do this, however, it is necessary for a problem analysis to have been carried out in the target market. Solving the challenges identified in this analysis is the value proposition of the IIoT platform. Success wishes such as “We must increase the efficiency of our processes by 50%”, on the other hand, are not an analyzed problem that is suitable for building a value proposition. Furthermore, it makes sense to focus on certain customer structures on the basis of a market prioritization in order to be able to align the value proposition more precisely. Once the problem analysis and market prioritization have been carried out, the platform vision can be defined. If an IIoT platform produces non-starters even though the

Best Practice

Problem marketplace

If the description of the problem is supposed to address volatile or opaque market needs, use a problem marketplace. Potential users post their challenges, and potential service providers address them. This setup gives the platform provider an overview of current user problems and the opportunity to cluster and (de)prioritize them.

Note: The problem marketplace does not relieve you of your duty to perform an initial market analysis and describe the problem before the platform launch

use cases are aligned with this vision, it is important to check to what extent the core elements of the value proposition mentioned above have been taken into account.

Non-starters

2. Governance

An IIoT platform's governance structures should always be established in line with the guiding principle of “Control only as much as is possible and only where necessary”. The example of an **operating model** to ensure compliance with use case guidelines has already been shown in practice to be a largely unsustainable solution with regard to the emergence of non-starters. The reason that this is the case is because the idea of creating a supervisory committee for prioritizing use cases often results in an extensive organizational structure involving processes and templates, which slows the speed of development without evaluating use cases based on sound data (e.g. exclusively evaluating a local business case calculation).

It makes more sense to have a lean organizational structure that focuses on enabling service providers to analyze their potential use cases in terms of what they contribute to the value proposition as part of a process that is driven by key figures and data. Service providers must also be given the appropriate resources in conjunction with corresponding obligations. If a use case turns out to be a non-starter, this may be due to inefficient governance structures on the one hand and a lack of resources on the other

Best Practice

Use case teams

Make the most of the resources that a governance structure provides and form centralized use case teams. Create them with the involvement of the use case ideas provider in question and task the team with scaling the use case in the target market rather than increasing local efficiencies.

Note: Use case teams are resource-intensive and costly. But, here, quality is more important than quantity – one successful digital product is preferable to ten non-starters.

Non-starters

3. Communication

The IIoT platform's **communication strategy** is the tool for sharing the value proposition. Let's assume you have defined your platform vision in a data-driven manner using market and user analyses, and the value proposition derived from them, as a basis. The strategy is well-rounded, reads well, and has the potential to be propagated to all the strategy clusters in your platform. In an ideal world, you can now count on all the players in your company and/or in the free market to recognize your platform project's added value and to start contributing to your platform straight away. Practice shows that a good platform strategy is not enough to help the platform succeed. All the players in the platform's target market (specialist divisions, sites, managers of their own companies, exter-

nal partners, etc.) are continuously bombarded with strategies, procedures, visions, etc., especially in large SMEs, large-scale enterprises and are also busy with their operational topics and challenges. So a platform strategy has to pass the “one sentence check” (meaning it must be possible to explain the value proposition in one sentence) and make it clear to service providers in particular which use cases are required to fulfill the platform’s value proposition. Otherwise, even an excellent platform strategy will turn out to be a non-starter if the communication strategy is not sound.

Best Practice

The pyramid of communication

Focus your communication strategy on both the players and their vertical organizational structure. Managers’ needs for information are different to those of skilled workers.

Note: Some use cases’ added value will not be reflected at all levels of the organizational structure. In this case, you should particularly address those levels that do not primarily benefit from a use case, but that are essential to its.

When considered in their entirety, non-starters can occur for a whole host of reasons, along with various stumbling blocks that can make it more difficult for the IIoT platform to grow and use cases to scale, or can even stop these things from happening entirely. The causes behind non-starters can become clearer if you take a closer look at the value proposition, governance and communication strategy clusters. This basis can be used to define problem-solving methods that will play a role in the IIoT platform’s success.

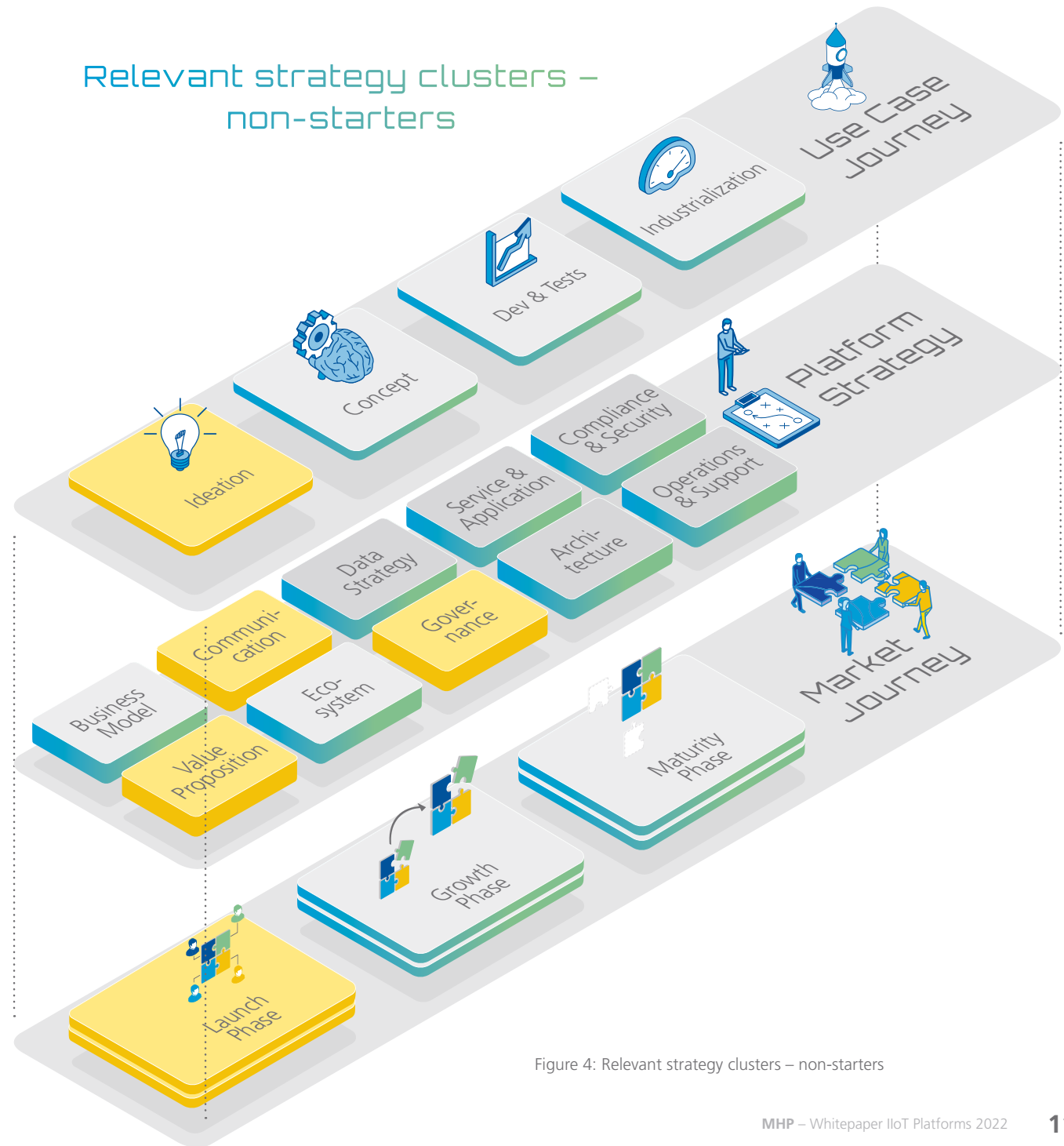


Figure 4: Relevant strategy clusters – non-starters

Challenge 2:

Potemkin villages

Potemkin villages are (literal or figurative) objects that look well-made and impressive on the outside, but have no real substance on the inside. Especially in times of increasing complexity of markets and technologies and the dynamics behind them, the effort to fully penetrate things and topics increases enormously. When dealing with technologies, taking this approach is associated with the risk of them quickly being written off as Potemkin villages if expectations are not met. Abstracted to IIoT platforms, it becomes clear in practice that a substantial amount of market players' trust can be lost if the promised value proposition does not materialize when the platform is launched.

For example, a platform launch without an attractive initial offering of functional, valuable services or use cases is not very effective, since the matching between users and service use case providers, which is essential for platforms, does not take place.. So market players will have a negative overall impression of the platform technology itself or of the platform provider.

As a result, the platform will not enter a growth phase after its launch, or only with considerable difficulty, since users and use case providers can only return to a Potemkin village after the initial disappointment through costly investments in customer acquisition. This is because the costs incurred for changing an IIoT platform are extraordinarily high due to the existing data volumes and connectivity solutions for machine connection, among other things.

At this point, the additional financial expenses in particular are offset by the resulting income. Since platforms tend to be more profitable in their later growth phases, an additional burden at the launch phase is ineffective.. This is why it is vital to include relevant clusters of the platform strategy in the platform launch planning process, to make sure solutions don't turn out to be Potemkin villages.

Potemkin villages

1. Value proposition

The importance of the value proposition as a key element of the platform strategy has already been highlighted above in the previous example. In the case of Potemkin villages, this particularly concerns the core element of **market prioritization**. Because it is similar to all other platform models, an IIoT platform will also experience the "chicken or egg" problem. The lack of users at launch of the platform leads to a low incentive for use case providers – and vice versa. At

the same time, the winner-takes-it-all dynamic of platform markets leads to the long-term dominance of one or more diversified platforms. Miss the right entry point (i.e. attempt to enter a consolidated market), and it will be nigh on impossible to position an IIoT platform with a similar value proposition. This leads to the challenge of directly fulfilling the platform's value proposition at platform launch at a time when the necessary platform ecosystem does not exist yet. In this context, market prioritization makes it possible to focus on market players whose needs absolutely must be satisfied during the platform launch. The platform operator can implement this using the likes of a seeding strategy, which populates the platform's range of services with assets and stops the platform from being launched as a Potemkin village.

Potemkin villages

2. Business model

As illustrated earlier, it only makes sense to launch an IIoT platform if it contains fundamental and attractive assets. However, since there are no users and service providers when the platform is launched, the platform provider must put a great deal of effort into initially providing services or users. This effort involved in preventing the platform from being viewed as a Potemkin village increases especially in heterogeneous markets where there are large number of players.

Therefore, the task of the business model is to analyze at **customer groups/market** sides as well as to plan the **platform growth** to develop these customer groups. In individual cases, it may be more effective not to launch the platform throughout the entire target market, but only in a market segment where

Best Practice

Seeding strategy

The platform provider appears as a player (user or use case provider) at platform launch and creates artificial demand for services or users by contributing its own content to the platform.

Note: It is important to withdraw from the seeding strategy in good time to prevent imbalance between different market players.

there are fewer platform service requirements and the market players are more resilient to “childhood diseases”. Specifically, instead of rolling out an IIoT platform directly across an entire enterprise, for example, it is possible to use a peer-to-peer approach where a pilot plant, or even a pilot area within the pilot plant that the platform will be launched in, is designated. The platform grows from this nucleus into the target market based on clearly defined development goals. As an analogy from the context of market platforms, the “Amazon story” and the growth from online bookseller to one of the world’s largest market platforms can be cited here.

Best Practice

Peer-to-peer scaling

The platform is launched locally, before gradually scaling into the target market using the peer groups (assets, maintenance groups, assembly lines, etc.) associated with this area.

Note: Peer-to-peer scaling can be a drawn-out process. Development goals must be firmly established, measurable and achievable in a short space of time.

Potemkin villages

3. Governance

Governance frameworks emerge with respect to the platform’s **operating model** based on the platform growth. The operating model is made up of different aspects, including openness or closedness to use case providers on the market. This provides information about which service providers can contribute to the platform in what form and, above all else, to what extent. While it is indeed important as a platform provider not to launch a Potemkin village, the quality of the platform infrastructure and the use cases counts too. Particularly after the launch, even resilient users are especially sensitive when first assessing platform performance.

A clear strategic approach towards the platform’s degree of openness can provide protection here to strike a balance between the platform being a Potemkin village and failing to deliver

Best Practice

Curation strategy

Use the building block strategy, for example, and specify fixed requirements in terms of reference implementation, etc., that use cases must meet before deployment on the platform. Conversely, you can also pursue a shopping cart strategy that does not involve significant hurdles.

Note: There are advantages and disadvantages, which must be weighed up against one another on a case-by-case basis, to both approaches. Another option is to take a hybrid approach.

To ensure that an IIoT platform is not launched as a Potemkin village, in this case too it can be said that understanding both the platform strategy and how it interacts with the market journey is vital to the IIoT platform’s success. Considering the relevant strategy clusters in advance saves major investment involved in restoring trust in the market.

Relevant strategy clusters – Potemkin villages

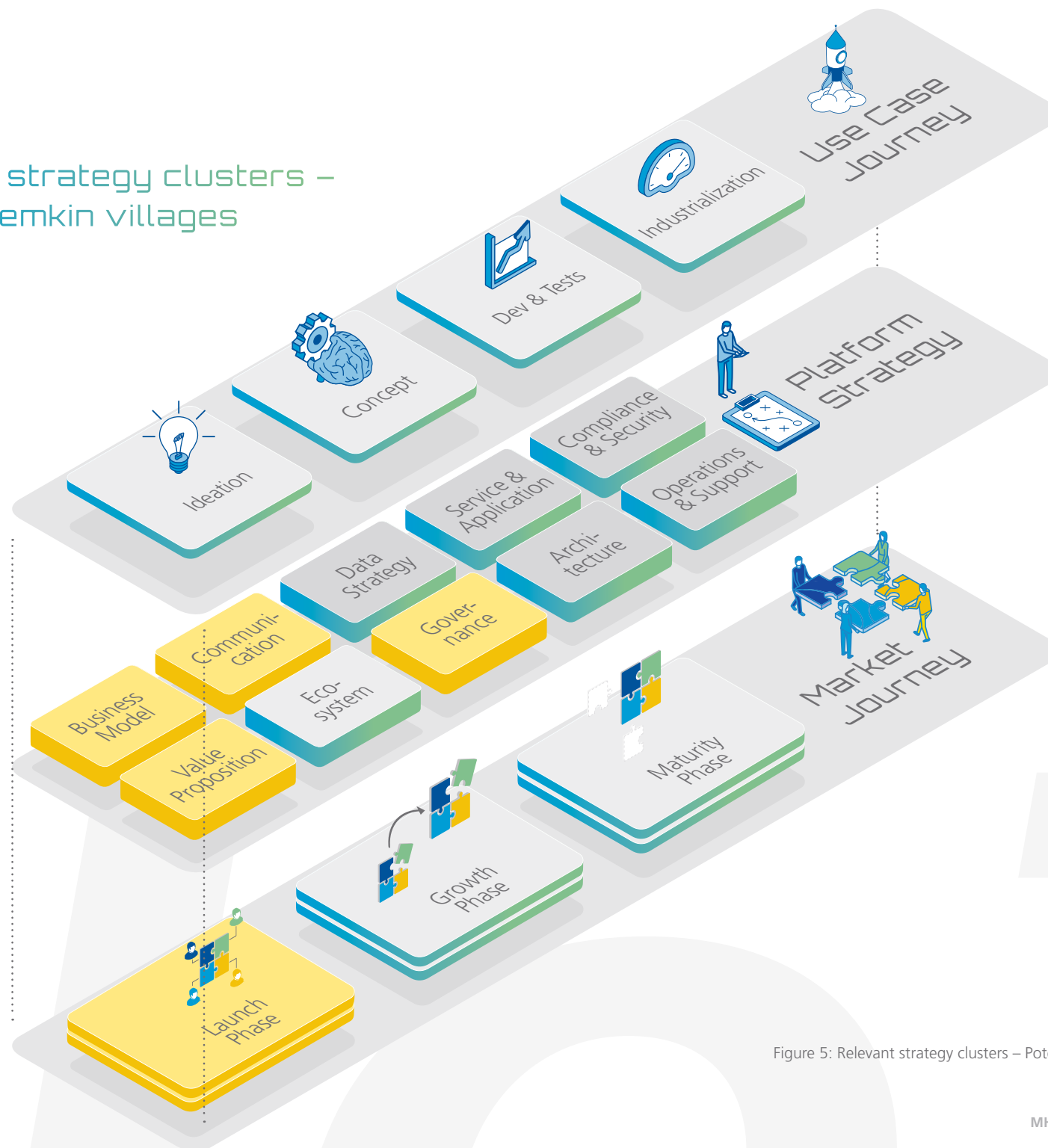


Figure 5: Relevant strategy clusters – Potemkin villages

Challenge 3:

Unfollowing an IIoT platform

While the idea of “following” something was conceived by social media, it can also be used as an analogy in the context of IIoT platforms. Since the number of followers can be considered an indicator of interest in a topic, person or company, it can be presumed that a declining or stagnating number of followers implies low interest. In the context of IIoT platforms, the number of target market players who are actively engaging in the platform can be viewed as an equivalent to the followers of a profile on social media.

Practical experience shows that interest in the IIoT platform may decline after a successful launch and initial growth. While this effect understandably occurs with Potemkin villages, it can also be observed in IIoT platforms with good assets. Users appear disinterested in adapting use cases and continue using their existing legacy systems that supposedly map the same functionality. Use case providers also often lose interest in implementing additional use cases following an initially high level of engagement with the platform, because the desired revenue stream does not materialize as hoped. There is a perception in the market that the IIoT platform adds little value and seems to be more of a personal project that is the brainchild of the platform provider’s top management team. So the platform’s growth in the target market and scaling of use cases fall short of expectations.

Similar to Potemkin villages, platform providers in these situations also try to boost interest in the IIoT platform through short-term financial incentives, which, however, often only result in a positive outlier of a stagnant or even negative platform growth curve.

Here, too, the focus must be on a sustainable, strategic approach as opposed to short-term solutions.

Unfollowing an IIoT platform

1. Business model

One of the most important core elements of the platform strategy is the platform **monetization** strategy. This isn’t just about the platform provider’s revenue, but also about a profitable revenue model for the use case providers and the users. In the external target market, the more price-sensitive side of the market (i.e. the side that the platform offers less added value for) must be subsidized with the other side’s income. This process is known as “cross-subsidization”. One approach that has been proven to work in practice is financing through service fees based on the provision of SaaS solutions. If, on the other hand, internal target market users (in situations where the platform provider is targeting its own plants or sites) lose interest in the platform and primarily use their local solutions, the introduction of platform-oriented management

DEEP DIVE Data-as-a-Product

Companies offer the data they generate for sale to other companies on a marketplace. A revenue model based on this approach is established using the likes of data volumes or time of use.

Note: Data marketplaces are not widely available because people are not trusting or are unwilling to share data at present. Initiatives such as the Industrial Data Space and Catena-X aim to overcome these challenges.

KPIs can encourage them to use the platform. There are also approaches to generate revenue streams that focus on all users of an IIoT platform too (e.g. Data-as-a-Product). This can spark interest among users from both an internal target market and an external target market in using the IIoT platform for good.

Unfollowing an IIoT platform

2. Ecosystem

The loss of user or use case provider interest in an IIoT platform can also be countered by a core social media principle. So, on each platform, the market sides in question have similar interests that they would like to see the platform serve. The possibility of strengthening exchange and networking within the sides of the market through the likes of **community management** also positions the IIoT platform as a social network. There is also a special focus on the **partner management** operations of companies that contribute to the platform as use case providers. Partner companies already supply the majority of the IT solutions in industrial enterprises, and will continue to do so for IIoT platforms. To this end, it is important to ensure that partner companies’ and the platform provider’s business models are in tune with one another. Potential pitfalls here include cannibalization of use case revenue by service fees that the platform provider charges, or complex legal or compliance guidelines that make the partner company lose interest in consistently getting involved in the IIoT platform.

Unfollowing an IIoT platform

3. Communication

In practice, the “unfollowing an IIoT platform” challenge often develops over an extended period of time, so platform providers do have the opportunity to counteract this development in a timely fashion, provided that it is transparent too. It is therefore important to enable communication – not only from the top down, but also from the bottom up, through feedback mechanisms. Negative trends on the various sides of the market and potential trends and innovations are valuable information for the platform provider.

So the “unfollowing an IIoT platform” problem is a challenge that can also be overcome based on strategic approaches that the platform provider can solve sustainably. All the players’ interest in contributing more to the platform can be strengthened based on a solid monetization strategy for internal and external users, not to mention use case providers, a sophisticated platform ecosystem and functioning communication mechanisms.

Best Practice

Bottom-up funnel

You should ideally install a bottom-up communications funnel in conjunction with strong community management. This allows you to access information from your platform’s central networks.

Note: A communications funnel does not relieve the platform provider of its duty to proactively gather feedback from the market sides

Relevant strategy clusters – unfollowing an IIoT platform

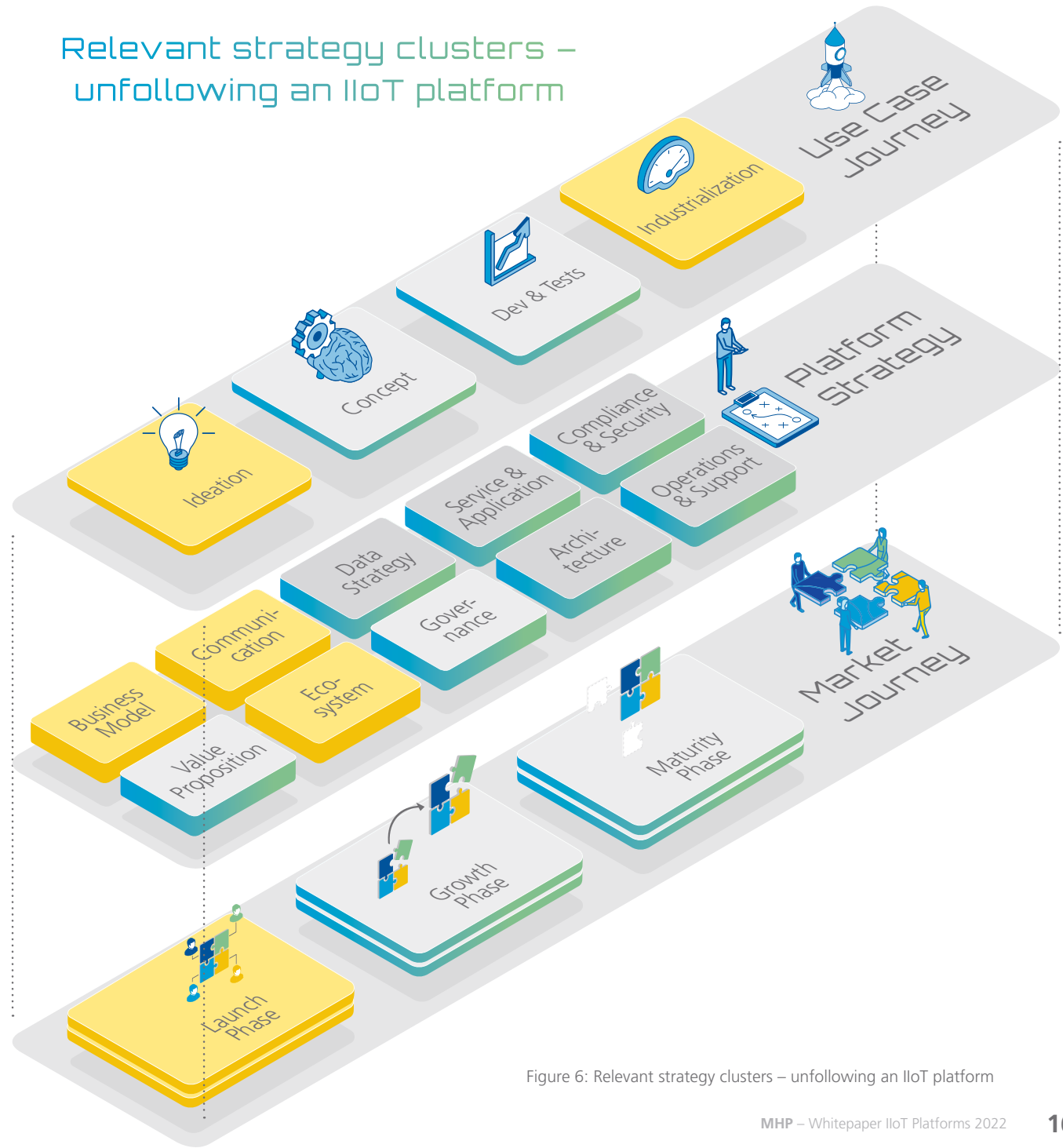


Figure 6: Relevant strategy clusters – unfollowing an IIoT platform

Challenge 4:**Plug-and-play myth**

A common challenge in industrializing use cases on IIoT platforms is their technical rollout. The notion, originally widespread in the industry, of users downloading the use cases from an IIoT marketplace similar to the Apple App Store and immediately putting the corresponding solution into production is now a thing of the past. In practice, use cases are developed with a focus on their local conditions and then adapted to the technical conditions on site (IT/OT system landscape, protocols and data models) outside their development environment through high engineering efforts. That way, the users (industrial enterprises, plants, specialist divisions, etc.) counter the heterogeneity of their brownfield IT landscape within the sites and focus strongly on the use cases' architecture. The resulting rise in costs for rolling out a use case and the lengthening timescale from a use case decision being made to implementation of the same makes users less keen to use non-proprietary applications or to abandon existing legacy systems. Consequently, the platform fails to build the necessary trust in its added value within the market, causing it to stagnate in terms of both its growth and the number of successfully implemented digital products.

Particular complexity also arises if, for example, hardware or software systems are closed, use cases are based on site-specific legacy systems and IT architectures are fundamentally different or not provider-

**DEEP DIVE
Architecture**

This white paper addresses architecture in the IT context. In this respect, architecture is often referred to as the structure of a system's components and their interrelationships, not to mention the principles and guidelines for designing and further developing them. (Def. acc. to TOGAF)

Note: It is essential to create a uniform understanding of what is meant by IT architecture among all those involved in a platform project.

agnostic. While investing in engineering effort for rolling out use cases and creating digital products in association with this may work on case-by-case bases, it does not solve the fundamental problem of use cases' technical structure. This is because it is particularly important to consider the platform strategy's technology-oriented clusters during implementation in addition to its business-oriented clusters.

Plug-and-play myth

1. Data strategy

Market players have focused strongly on the use case's architecture as part of turning the plug-and-play myth into a reality. However, they often fail to address the fact that issues relating to IT architecture are largely determined by the (sometimes non-existent) data

strategy. This ensures that, in line with the value proposition of the IIoT platform, precisely that data is made available in the quantity, quality and on the basis of a standardized data model that contributes to the realization of the value proposition through its utilization in use cases. The complete definition of the required data is followed by the analysis of the necessary data sources (assets), which create and process them. This analysis provides relevant information about the degree of homogeneity or heterogeneity of the IT landscape prevailing in the market. For example, a high degree of heterogeneity is a strong indicator of a large number of different data models and a great deal of effort to establish integrated **connectivity**. It is vital that these findings are taken into account when defining a uniform architecture for use cases and when designing and developing the platform architecture.

**Best Practice
Data strategy**

As a platform provider, think carefully about how data can help to meet your IIoT platform's value proposition. There are different dimensions to a data strategy, and choosing which of them you find interesting is highly relevant to the technical direction your platform takes.

Note: Failing to prioritize data strategy dimensions makes matters highly complex. Focus on relevant content for your platform.

Plug-and-play myth

2. Architecture

Instead of IT architects and development teams fighting fires locally to tailor a use case to a specific user, the platform's and the use cases' architecture should be defined as a strategic element based on the data strategy. Ideally, the platform architecture already provides functional building blocks that can be used in the use case architecture. On the one hand, this reduces the development effort for use case providers and, on the other, standards and guidelines are implemented. The required functional building blocks result from the data sources analysis performed as part of the data strategy. In an industrial context, there are usually industry/technology standards that describe how software and hardware interact and are defined in this respect in hardware-agnostic terms to address the existing problems concerning heterogeneous IT system landscapes.

Developing functional building blocks isn't the only thing that's important; the platform provider's or user's cloud strategy must also be integrated in the context of the architecture. Local challenges of the plug-and-play myth may arise here, too, since users may not yet be connected to a cloud, the infrastructure provider (cloud provider) may not serve sites yet, and so on. Current developments with regard to cloud strategy, which also have to be taken into account in the context of platform architecture, are highlighted in the MHP white paper entitled "**Beyond The Cloud – A Glimpse Into The Future In Nine Proposals**".



DEEP DIVE

AAS, an industry standard

One example of an industry standard that can be taken into account in an IIoT platform's architecture is the Asset Administration Shell. This standard, developed by the German Mechanical and Plant Engineering Association (VDMA), provides a tool for describing assets in hardware-agnostic terms using standardized data models.

Note: There are a multitude of industry standards for different sectors, among other things. The way standards are adapted must be geared toward an IIoT platform.

Plug-and-play myth

3. Services and applications

Unlike the architecture field of action, the services and applications one does not deal with deciding which functional building blocks are provided by the platform and used in the use cases. How these building blocks are implemented is far more important. Here, too, the effects of the plug-and-play myth are countered by defining a uniform **technology stack**, which includes the likes of questions about source code type (open source, open interface, open components, closed code, etc.), application interfaces (APIs) or software development kits (SDKs). **Deployment** in the local environment of the target market must also be ensured, particularly with regard to the use cases. This is another point where there are different variants of technical

opportunities that significantly reduce or even render obsolete the reactive engineering effort involved in locally implementing a use case on the user's site.

Best Practice

Architecture committee

Implementieren Sie ein Architekturgremium, welches die Einhaltung der im Handlungsfeld Architektur definierten Standards im Kontext von Services & Applications prüft und weiterentwickelt. Nutzen Sie dieses auch für das Enablement weiterer Akteure innerhalb des Plattform-Ökosystems.

Achtung: Jedes zusätzliche Gremium kann ihre Entwicklungsgeschwindigkeit verringern. Implementieren Sie schlanke Prozesse.

From a technical point of view, the plug-and-play myth is one of the main reasons why IIoT platforms do not gain momentum in the growth phase and use cases do not mature into digital products. Strategically focusing on a sophisticated data strategy that is geared toward the target market and the value proposition forms the foundation of overcoming this challenge. In this context, deriving architecture standards and implementing them using uniform services and applications sets the scene for significantly reducing the engineering effort involved for all players in the market.

Relevant strategy clusters – plug-and-play myth

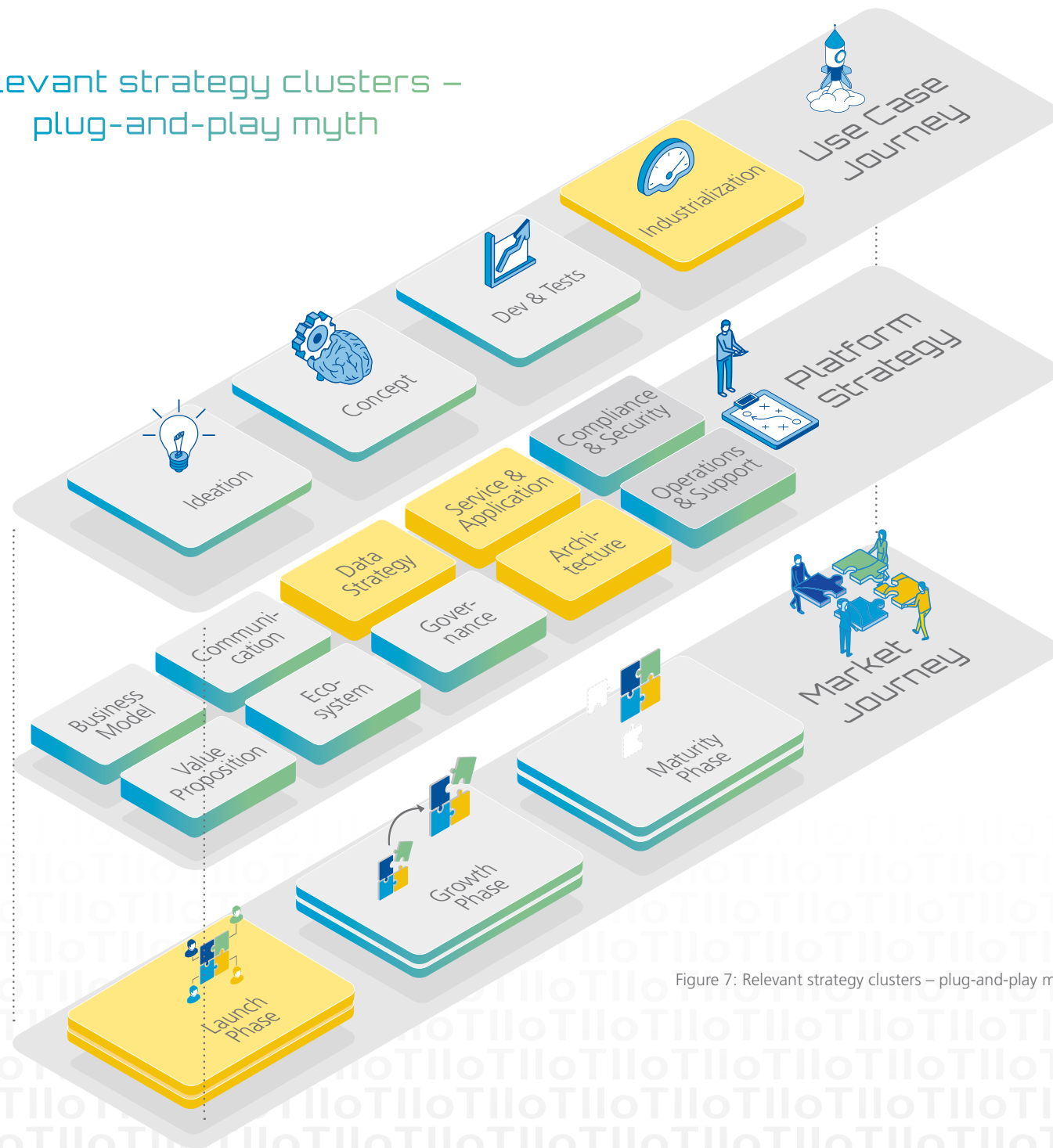


Figure 7: Relevant strategy clusters – plug-and-play myth

In a Nutshell

IIoT platforms have caught on in industry as a core element of future-proof production and logistics IT. The first few early adopters have started implementing or developing IIoT platforms. As usual, these early adopters have to contend with the teething problems that go hand in hand with innovative technology that is currently falling short of their expectations. Platform providers, users and service providers all need to be extremely patient when IIoT platforms are failing to grow in their target markets and there is only a small number of digital products available.

Practice shows that most of the current roadblocks to successful use of IIoT platforms are created by a patchy platform strategy and a lack of understanding of the impact that this strategy has on the platform's market and use case development.

This white paper has analyzed some of the most common roadblocks with regard to this interaction. Developing use cases that are unrelated to the platform's value proposition, the platform lacking assets at market launch, declining interest in using or contributing to the platform and lack of a solid technical base for use cases have all been contrasted with the relevant clusters of a platform strategy. A selection of specific

instructions have provided inspiration for decision makers at all levels of an IIoT platform that they can take into account when faced with identical or similar problems.

The MHP platform assessment forms the foundation of the statements made in this white paper, which analyze the topic of platform strategy and how it interacts with the market and use case journey.

Based on extensive project experience involving numerous industrial enterprises, the MHP platform assessment was developed as a consulting service for platform providers who are planning to build or have already built a platform. The content, methods and best practices are developed purely based on specific projects and provide a framework for targeted end-to-end consulting from the vision of the platform to use case implementation.

Contact

Publisher

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Credits

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An aerial photograph of a dark asphalt road that winds through a lush, dense green forest. The road has white dashed lines and curves in an S-shape. Two cars are visible: a dark-colored car in the upper right section of the road and a red car in the lower middle section. A semi-transparent teal and blue rectangular overlay is positioned in the center of the image, containing white text. The overall scene is vibrant and natural.

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