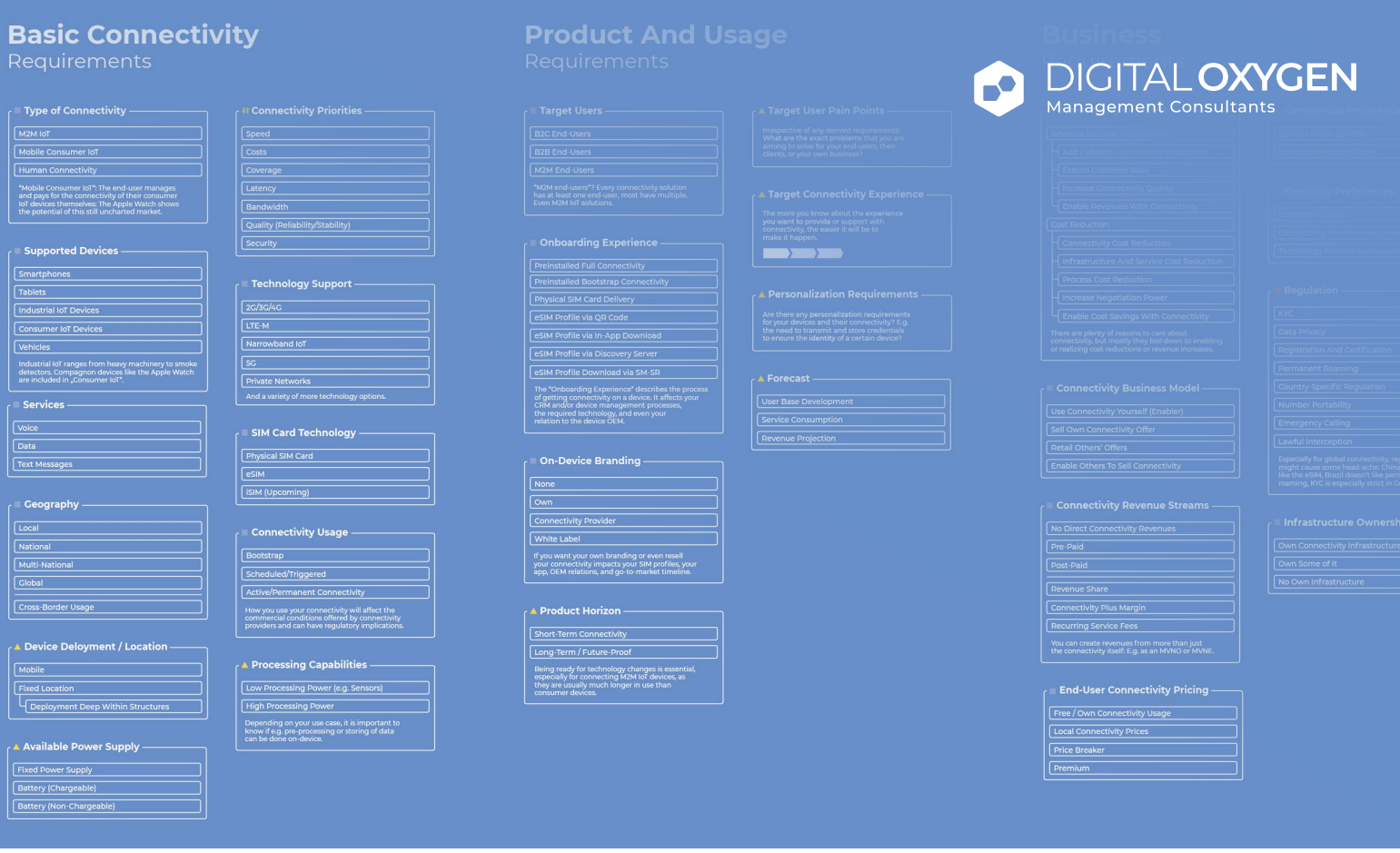

Mobile Connectivity Canvas

The Crucial Dimensions of Mobile Connectivity

April 2021 | Axel Meiling, Tobias Woldrich, Katharina Finke

Digital Oxygen is a management consultancy based in Munich, Germany, with a focus on digital transformation and digital product development in the fields of telecommunication, media, and digital healthcare. World-wide, clients trust us with their strategic challenges: From value proposition development and digital product development to launch. From start-up to multinational enterprise.

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Stating the Obvious

Mobile Connectivity Is Complex and Everyone Struggles

In more than 20 years of handling mobile connectivity projects, products, and strategies, basically each project had two things in common:

- **Everyone** dealing with mobile connectivity **struggles somehow**.
- **Everyone underestimates the complexity** of mobile connectivity initially.

In this article, my colleagues and I want to shed some light on the complexity of mobile connectivity – and propose a **Mobile Connectivity Canvas** to structure and relieve some of your mobile connectivity pains.

Who Should Care About "Mobile Connectivity"?

1) **Optimizing Existing Connectivity:** Everyone who **already relies on mobile connectivity** for – let's say – **1,000 or more connected devices** like smartphones, IoT devices, or cars, somehow struggles with one of the following issues:

   - **Connectivity Costs:** That is when the famous "bill shock" hits you every single month: You know you have unfavorable connectivity terms or your connectivity costs are simply untransparent.
   - **Operator Lock-In or Dependencies:** Switching operators can seem impossible – for example when the costs for switching SIM cards are already higher than the connectivity cost savings.
   - **Device Management:** There are plenty of issues that can arise when you manage a large number of connected devices: Starting with replacing a lost phone (and its connectivity) to providing affordable connectivity to a travelling employee.
   - **Connectivity Quality and/or Coverage:** Especially if you rely on global connectivity, patchy network quality and coverage will be quite familiar – and a problem if you need reliable, high quality connectivity for your customers, devices, cars, or employees.
   - **Regulatory Restrictions:** China is not a fan of the eSIM, Brazil and many others don't like permanent roaming, lots of European countries have very strict KYC requirements: Regulation is messy.

   As a result, lots of companies usually face a daily, frustrating struggle to **change anything** about their existing connectivity solution.

2) **Getting Started with Connectivity:** Then there are cases, where your challenge is to connect devices, but you simply **do not know where to start**. For example:

   - You want to provide connectivity to **employees** ("Enterprise Connectivity").
   - You need to connect your **IoT devices** (from cars and smoke detectors to consumer IoT like the Apple Watch or other smart watches).
   - You need to connect your **factories** (smart or not, via "Campus Networks").
   - You want to offer **connectivity as a service** (like "end-user data plans").

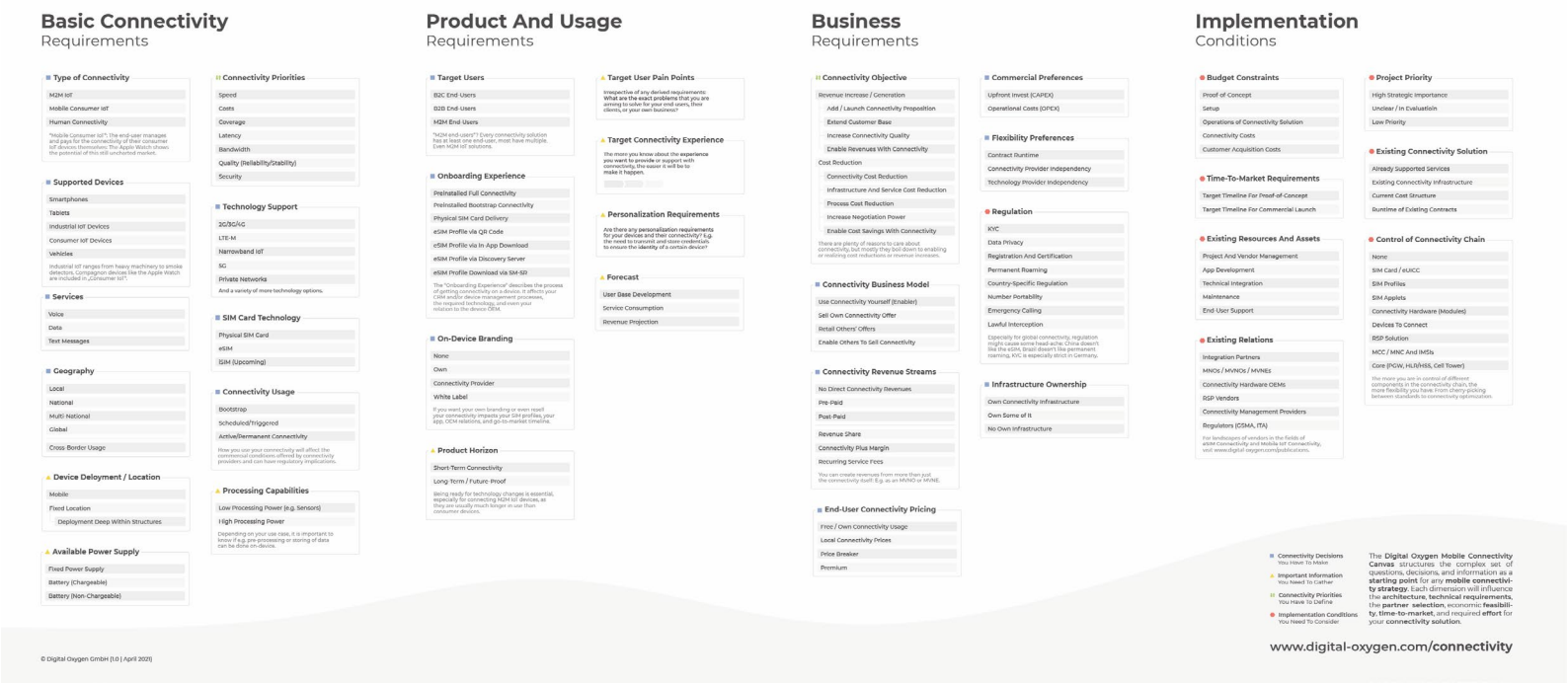
A Big Word: Mobile Connectivity Strategy

Of course: A consultancy proposes a **strategy**, right? Not really – we just urge you to **make a plan** when it comes to your mobile connectivity. Whether you call it a "strategy", a "roadmap", or a "project plan": Who cares. But it saves you a ton of money, lifetime, pivots, negotiations, and nerves if you **ask and answer the right questions** upfront.

Mobile Connectivity Canvas

The Crucial Dimensions of Any **Mobile Connectivity Strategy**

DIGITAL**OXYGEN** Management Consultants



The Mobile Connectivity Canvas

Connectivity Is Complex – Not Complicated

With this Mobile Connectivity Canvas, we take a step back and take inventory of all **issues**, **questions**, **decisions**, and required **information** you need to have on your list. It is a guide to clear the first hurdle towards your individual connectivity strategy by breaking down a complex topic into 34 manageable chunks and four main categories:

- **Basic Connectivity** Requirements
- **Product And Usage** Requirements
- **Business** Requirements
- **Implementation** Conditions

You can **download** the Mobile Connectivity Canvas for free at www.digital-oxygen.com

Basic Connectivity Requirements

- Type of Connectivity
- Supported Devices
- Services
- Geography
- Device Deloyment And Location
- Available Power Supply
- Connectivity Priorities
- Technology Support
- SIM Card Technology
- Connectivity Usage
- Processing Capabilities

Product And Usage Requirements

- Target Users
- Onboarding Experience
- On-Device Branding
- Product Horizon
- Target User Pain Points
- Target Connectivity Experience
- Personalization Requirements
- Forecast

Business Requirements

- Connectivity Objective
- Connectivity Business Model
- Connectivity Revenue Streams
- End-User Connectivity Pricing
- Commercial Preferences
- Flexibility Preferences
- Regulation
- Infrastructure Ownership

Implementation Conditions

- Budget Constraints
- Time-To-Market Requirements
- Existing Resources And Assets
- Existing Relations
- Project Priority
- Existing Connectivity Solution
- Control of Connectivity Chain

Structure of the Mobile Connectivity Canvas

Module 1: **Basic Connectivity Requirements**

Laying the Groundwork for Your Connectivity Strategy

In this module, you mostly need to make decisions regarding your **connectivity use case** and the underlying **technical requirements**: Which devices are you aiming to connect: Are we talking about industrial IoT, mobile consumer IoT (like the Apple Watch), consumer connectivity devices (like iPhones), or cars? Where and how are you going to deploy these devices? What do you care about most: Connectivity prices, quality, or coverage?
And many more:

- Type of Connectivity
- Deployment and Location
- SIM Card Technology
- Supported Devices
- Available Power Supply
- Connectivity Usage
- Services
- Connectivity Priorities
- Processing Capabilities
- Geography
- Technology Support

Deep Dive: SIM Card Technology

Each of these criteria has implications. For example: What does it matter if I want to use physical (plastic) SIM cards or eSIMs for my connectivity?

	Physical SIM Card	**eSIM**
Onboarding Experience	Delivery of a plastic SIM card via mail – no way around that.	Multiple “onboarding” options: From scanning a QR code to an entirely digital experience without killing a single tree.
Infrastructure		You need an SM-DP+ or SM-DP and SM-SR for the management of eSIMs. That is another partner you have to take into account.
Supported Devices	With regards to consumer devices, most of them still have a physical SIM slot.	The eSIM reaches more and more smart-phones, but still, you are limiting yourself to a small subset of iOS and Android eSIM devices.
Operator Dependency	If you want to switch operators, you switch the SIM card – that can be a costly and logistical challenge. Sending 10,000 letters with SIM cards is one thing. But it is a different effort if you have to cut into each of your money transporters with a cutting torch to reach the highly secured SIM card.	The eSIM makes operator switching much easier – it is still not entirely “free”, but it is much easier to distribute new eSIM profiles over-the-air to your customers or employees.

Any many more implications…

Implications of SIM Card Technology on Connectivity Solution

Module 2: **Product and Usage Requirements**
Solving Pain Points and Shaping User Experience

In this dimension, you should get a clear picture of which connectivity experience and product you want to offer: **Connectivity is not (only) a shiny product for you to advertise on your website but solves a very specific set of pain points for you and your users.** For that purpose, you need to define your target users or devices, understand their usage context and challenges, and think about your connectivity lifecycle from onboarding over management to shut down.

- Target Users
- Onboarding Experience
- On-Device Branding
- Target User Pain Points
- Target Connectivity Experience
- Personalization Requirements
- Forecast
- Product Horizon

Deep Dive: Branding

Let's go down the rabbit hole again for one of these criteria: Why does "Connectivity Branding" matter? Assuming we want to launch our own "Digital Oxygen" connectivity offer for our team and care a lot about branding: We want to see "DiOx" as the service provider name (SPN) in the upper left corner of the phone.

	Some Implications of On-Device Connectivity Branding
SIM/eSIM Vendor	The branding needs to be configured in the SIM profile template. If we use plastic SIM cards, we need to define a design that is printed on the SIM card.
OEM Relations	That is a fun one: If you want to see "DiOx" in really all interfaces of your smartphone (like in settings or during installation of an eSIM profile), you will not get around a contract with the major smartphone OS OEMs like Apple or Google.
Timeline	Compared to non-branded connectivity, the above changes will certainly have an impact on your time-to-market - of up to 9 months.
And many more implications...	

Implications of On-Device Branding on Connectivity Solution

Module 3: **Business Requirements**
Let's Talk Money, Strategic Goals, and Regulation

This section is all about your **business goals and requirements**: Why do you care about connectivity? Do you need to reduce connectivity cost or increase your revenues from or through connectivity? How important is it for you to own all your telco infrastructure or are you happy to have somebody else run it?

- Connectivity Objective
- Connectivity Business Model
- Connectivity Revenue Streams
- End-User Connectivity Pricing
- Commercial Preferences
- Flexibility Preferences
- Regulation
- Infrastructure Ownership

Deep Dive: Regulation

Especially regulation can cause some serious headache when you are trying to implement a connectivity solution across multiple countries.

Deployment Region	Regulatory Implication
China	Does not support the eSIM (but are developing their own solution).
Brazil (and others)	Do not allow permanent roaming.
Germany (and others)	Ask for strong KYC (Know-Your-Customer) identification.
Most Countries	Do not have VoLTE Roaming implemented, so your Apple Watch will not work when roaming.

And many more regulatory surprises like the right for number portability or the need to support emergency calling.

Regulatory Implications of Connectivity Deployment Region

Module 4: **Implementation Conditions**
Assessing Internal Resources and Capabilities

That is your reality check: This dimension aims at understanding the **budget, assets, tools, and prerequisites** that you have at hand to implement your individual connectivity solution. Do you already have existing resources and assets that you can build upon? What is the budget and timeframe for implementation? And have you already established useful business relations with partners and vendors?

- Budget Constraints
- Time-To-Market Requirements
- Existing Resources and Assets
- Existing Relations
- Project Priority
- Existing Connectivity Solution
- Control of Connectivity Chain

Deep Dive: Control of Connectivity Chain

Let's say you are a car manufacturer and want to connect your cars. Depending on how much of the connectivity chain you can control, your options and flexibility will increase – let's explore the example of operator dependency:

If You Control	That Means
only the SIM card in the car	you control the **operator that provides connectivity** and can **switch SIM** cards, e.g. to optimize costs.
the SM-SR that serves your SIM profiles	you can automatically push new eSIM profiles to the car, e.g. to use a cheaper operator when travelling between countries.
the connectivity module and the software on it	you have a whole new set of options: You can e.g. use the **eSIM consumer standard** (instead of the M2M), which will save you quite some hassle for operator integrations.
And many other implications when you control e.g. one or multiple PGWs or SIM applets.	

Implications of Connectivity Chain Control on Operator Dependency

Wrap Up

1,000 Connectivity Questions and 1 Honest Answer

In a nutshell: There is a lot to consider when finding the path to your perfect connectivity solution. As you can see, there are probably 1,000 perfectly valid questions around connectivity – with just one honest answer: **It depends.** On your connectivity use case(s), your business goals, and the preconditions. But you have to start somewhere – and hopefully this Canvas makes the start a bit easier.

About the Authors

Axel has 20 years of experience in the Telco and IoT industry, has seen connectivity projects from every angle, and has a profound understanding of **all relevant technical solutions to connect devices**. He has led countless connectivity projects – for international M(V)NOs, OEMs and IoT vendors – and knows all the pitfalls, shortcuts, and success factors to guide enterprises towards a tailor-made connectivity solution.

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Tobias has built several MVNOs from scratch and is an expert in **selecting, evaluating, and onboarding suitable connectivity partners** and vendors. He has a unique expertise in the development of user-centric value propositions from architecture to launch and beyond.

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Katharina has hands-on experience in developing **cloud telco and local breakout solutions** – from mapping out initial requirements and characteristics, defining technical architecture and solution design, to project planning and actual implementation.

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