

WHITE PAPER

ACCELERATING RAILWAY DIGITALIZATION — THE STARTUP SECTOR'S PERSPECTIVE

In this white paper, we describe some of the main challenges that startups in railway experience on their path to commercialization and growth, and what they believe must change in the entire industry in order for innovation and digitalization to accelerate.

INTRODUCTION

THE RAILWAY STARTUPS

The rail industry is largely characterized by continuous consolidation, which over decades has led to the emergence of few market-leading global players. At the same time, each market is rich with a tremendous amount of local small and medium-sized enterprises (SMEs) - an invaluable source of service, excellence and innovation. Within the last couple of years, however, a third type of company has emerged - startup.

At first glance, these new types of entities seem to share many of the formal characteristics of SMEs such as: few employees, and (at least in the early days) small revenues. At the same time, startups are a completely different breed of company with very unique characteristics, ambitions, perspective, and impact on the industry. We believe that the voice of startups has been largely underrepresented within the general railway industry discourse, and so we set out on a mission to unite and amplify the voice of startups in rail.

DIFFERENCES BETWEEN A STARTUP AND AN SME

	SMES	STARTUPS
FUNDING SIZE & SOURCE	Boot-strapped or debt financed	Boot-strapped/or Angel- and VC-backed
GROWTH	Moderate growth	Aggressive/exponential growth
BUSINESS PRIORITY	Becoming cash positive	Fueling growth and market share
AMBITION	Embed themselves in the industry	Disrupt the status quo and transform the industry

One of the key differences between startups and SMEs is their growth ambition and the impact they aim to have on their industry. Most startups are more than willing to reinvest in aggressive growth strategies and aim to transform how industries work. They fundamentally question the status quo, and challenge established ways of working and thinking. In addition to industry

experts, the company boards of startups also often include venture capital investors who bring a unique outsider perspective, having witnessed first-hand the transformative journey of the tech industry.

These unique differences in mindset convinced us that startups' perspectives on their biggest challenges, as well as opportunities, to accelerate the speed of digitization, are worth exploring.

SURVEY PARTICIPATION OVERVIEW

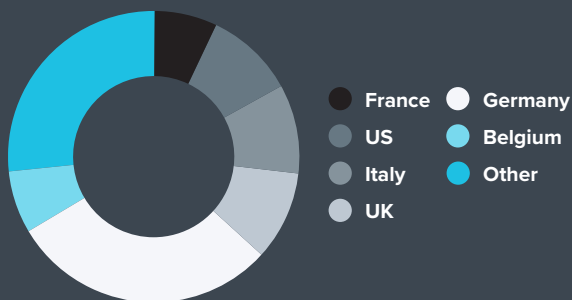
In order to shed light on what startups find most difficult in different stages of commercialization and provide a fresh perspective on how we see the future, KONUX initiated the survey “Startups and Digitalization in the Railway Industry” and reached out to 350+ rail startups in Europe and beyond.

We gathered input from over 30 companies in 14 countries, spanning across the railway infrastructure and rolling stock markets. Most companies (80%) have successfully completed a pilot project in their field, achieved product acceptance (57%) and are looking to enter new markets (83%). The aggregate funding across the 30 companies amounts to over €170 million euro. After the survey was completed, we also invited the participants to join a live discussion round and add context to their answers.

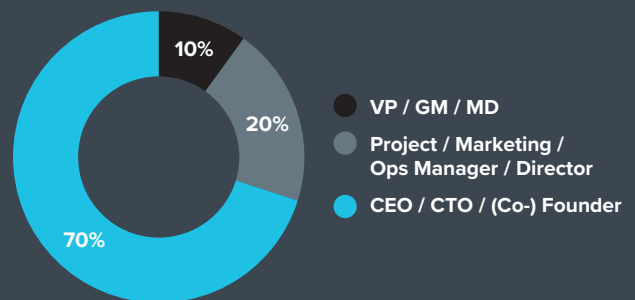


ABOUT THE RESPONDENTS

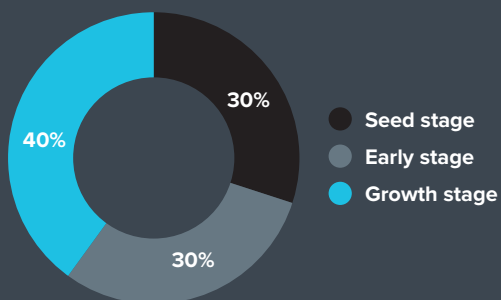
We gathered input from companies in 14 countries



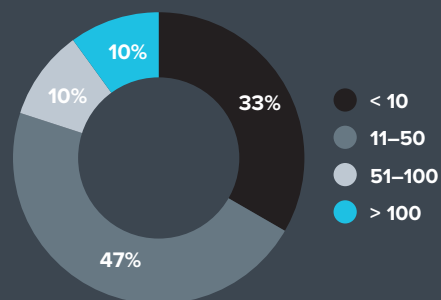
Most responses are provided by CEOs or Founders of the company



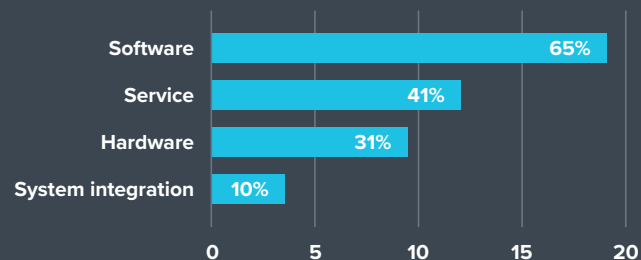
40% of startups are in growth stage



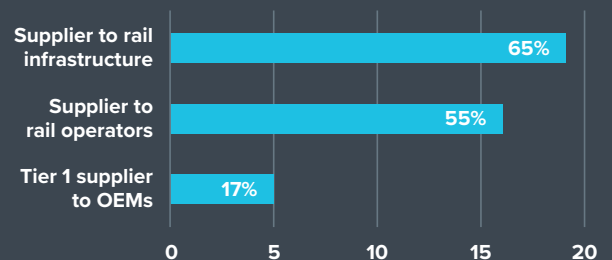
Overview of number of employees



65% describe themselves as software company



63% are suppliers to infrastructure owners



BIGGEST CHALLENGES STARTUPS IN RAIL ARE FACING

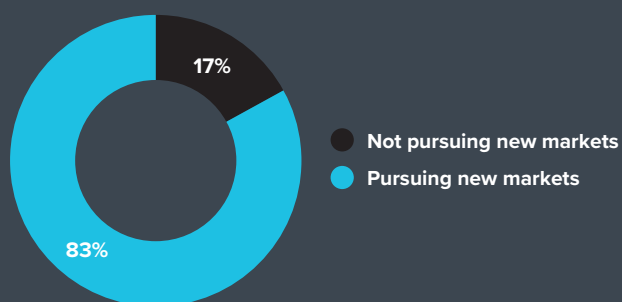
THE NEED FOR INTERNATIONALIZATION

Rapid growth is one of the defining characteristics of startups. Especially when it comes to the infrastructure sector, which is often dominated by one state-owned company, growth depends on internationalization. As sales cycles tend to be lengthy and span multiple years, working on numerous customers simultaneously is crucial to the satisfaction of the growth ambitions of both the startups and their investors.

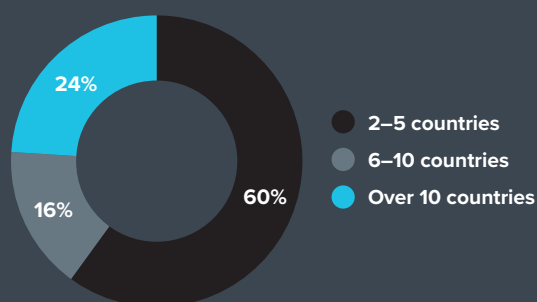
While certain factors — environmental conditions, climate, network and asset design, equipment manufacturers, access to data, connectivity, and customer processes and procedures — may vary significantly, sufficient similarities often found between railway systems make the case for aggressive internationalization. According to the survey, 83% of the companies are pursuing entrance into new markets, and almost half of them are active in more than five countries. Some startups aim to achieve this with minimal product adaptation, but they still face a multitude of additional challenges.

MOST OF THE RESPONDENTS ARE PURSUING ENTRANCE INTO NEW MARKETS

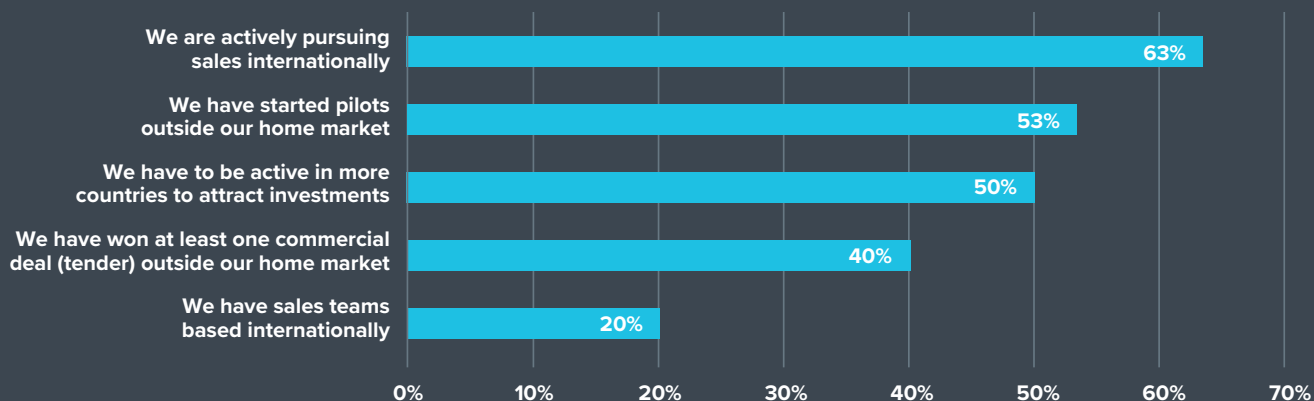
83% pursuing entrance into new markets



Most are active in multiple markets already



Different progress on internationalization



WHAT ARE THE CHALLENGES

The world of startups and railway may seem incompatible at first sight. The former strive for agility, speed, and disruption, the latter for safety, process and stability. There are many challenges for startups in rail, from technology to political frameworks, and culture, but what the respondents considered the biggest obstacles are:



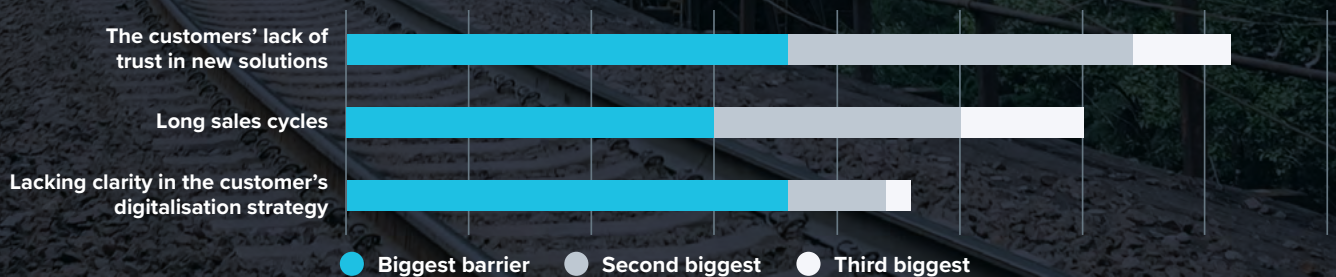
The customers' lack of trust in new solutions



Long sales cycles



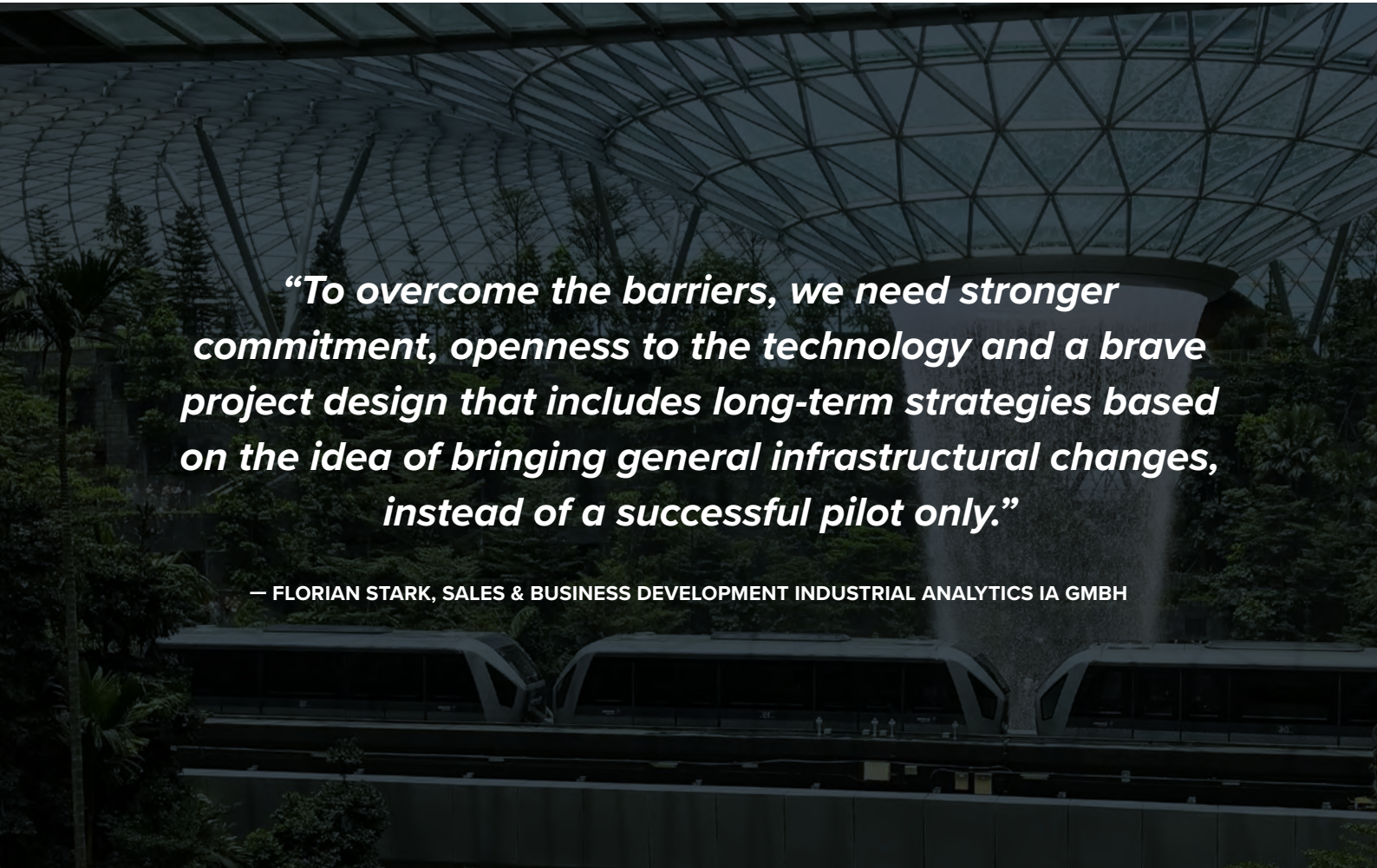
Lacking clarity in the customer's digitalization strategy



LACK OF TRUST IN NEW SOLUTIONS

Biggest Barrier

Railway prioritizes safety above all else, and for a good reason. We all want solutions to be thoroughly tested and proven in the field over a long period of time. What we do observe, however, is that even after a product has been in the field and in operation for years, there is still a level of mistrust and resistance to new solutions. Each customer requires to witness the solution in operation in their environment to witness all seasons, and to validate their unique use cases and prove the business case. Yet, as use cases build and prove their value, trust is likely to grow.



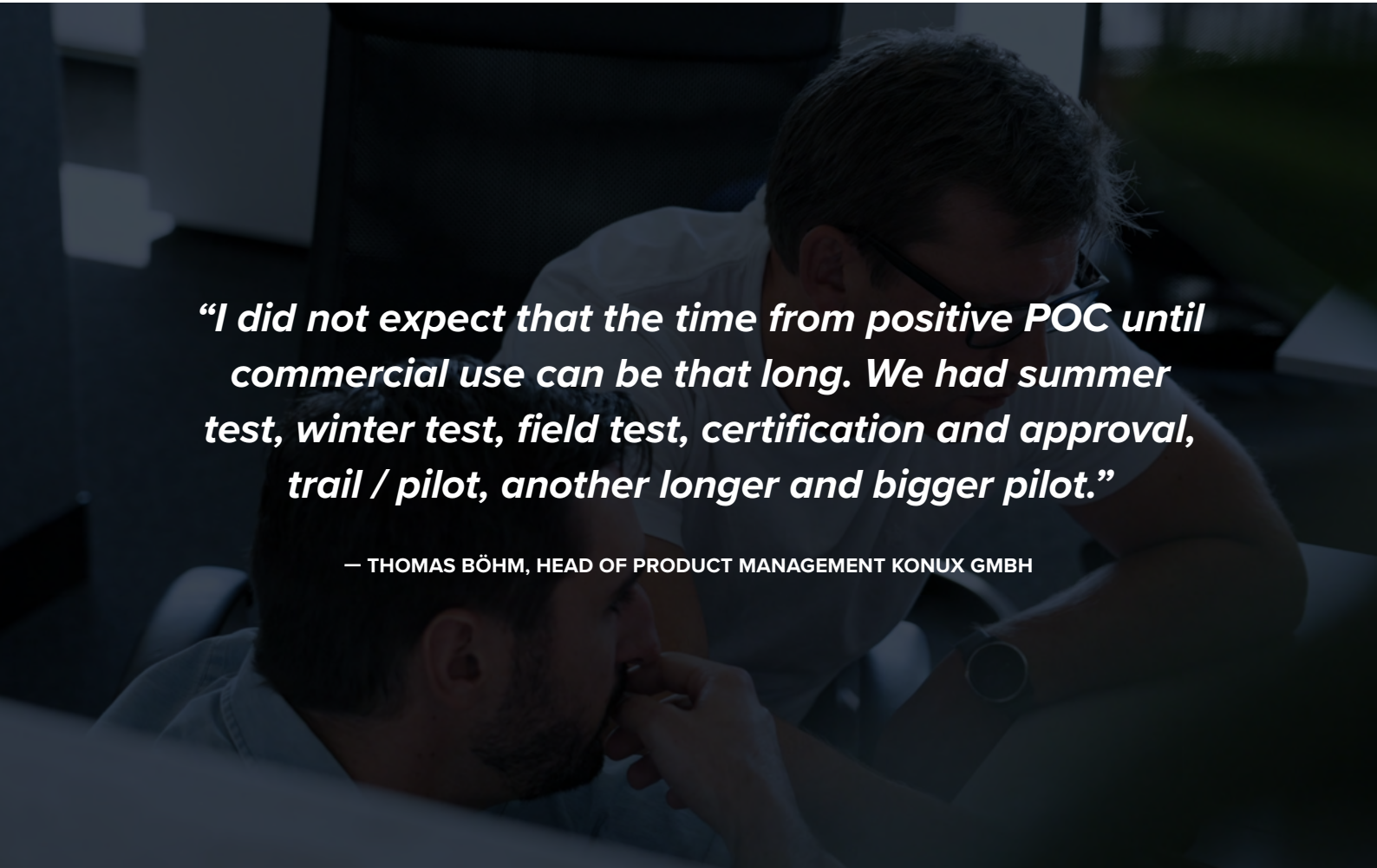
“To overcome the barriers, we need stronger commitment, openness to the technology and a brave project design that includes long-term strategies based on the idea of bringing general infrastructural changes, instead of a successful pilot only.”

— FLORIAN STARK, SALES & BUSINESS DEVELOPMENT INDUSTRIAL ANALYTICS IA GMBH

THE SALES CYCLES NEEDN'T BE THIS LONG

Second biggest barrier

As with most B2G-like industries, the rail industry is characterized by long purchasing processes, including public tenders. The cost and complexity of public tenders can be prohibitive to early stage startups lacking the funds to accommodate the process and ensure compliance. But in the eyes of the respondents the lack of clarity, accountability, and commitment to moving from a pilot to a commercial roll-out are slowing down the process even further.



“I did not expect that the time from positive POC until commercial use can be that long. We had summer test, winter test, field test, certification and approval, trail / pilot, another longer and bigger pilot.”

— THOMAS BÖHM, HEAD OF PRODUCT MANAGEMENT KONUX GMBH

LACK OF CLARITY ON DIGITALIZATION STRATEGY

Third biggest barrier

While the bureaucratic structures impeding full digitalization are not directly influenceable, helping the large rail organizations understand the topic on a governmental level and in government-backed organizations has made significant leaps forward in the past decade. At the same time these entities can also benefit from context in digitalization through their interactions with startups.



“The process of approving new products must be clearer and enhanced by the end customer or owners.”

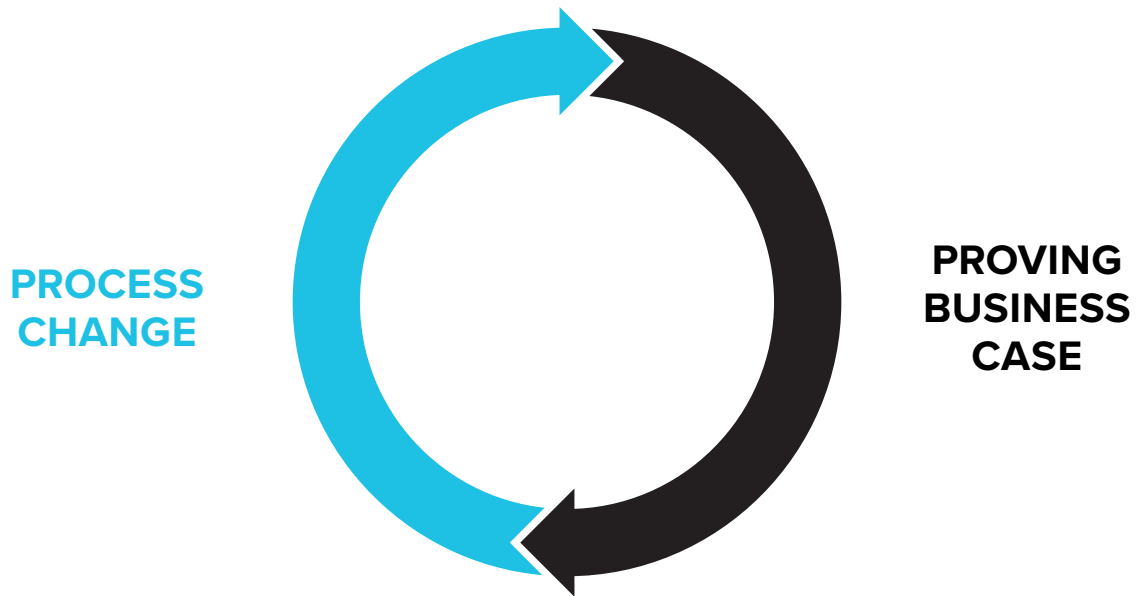
— A SURVEY RESPONDENT

“Most of the times the companies are exploring possibilities in pilots that are designed to be tested with one or two trains, often lacking the long-term strategy to build e.g., the data infrastructure for the potential scaling of such a solution.”

— FLORIAN STARK, SALES & BUSINESS DEVELOPMENT INDUSTRIAL ANALYTICS IA GMBH

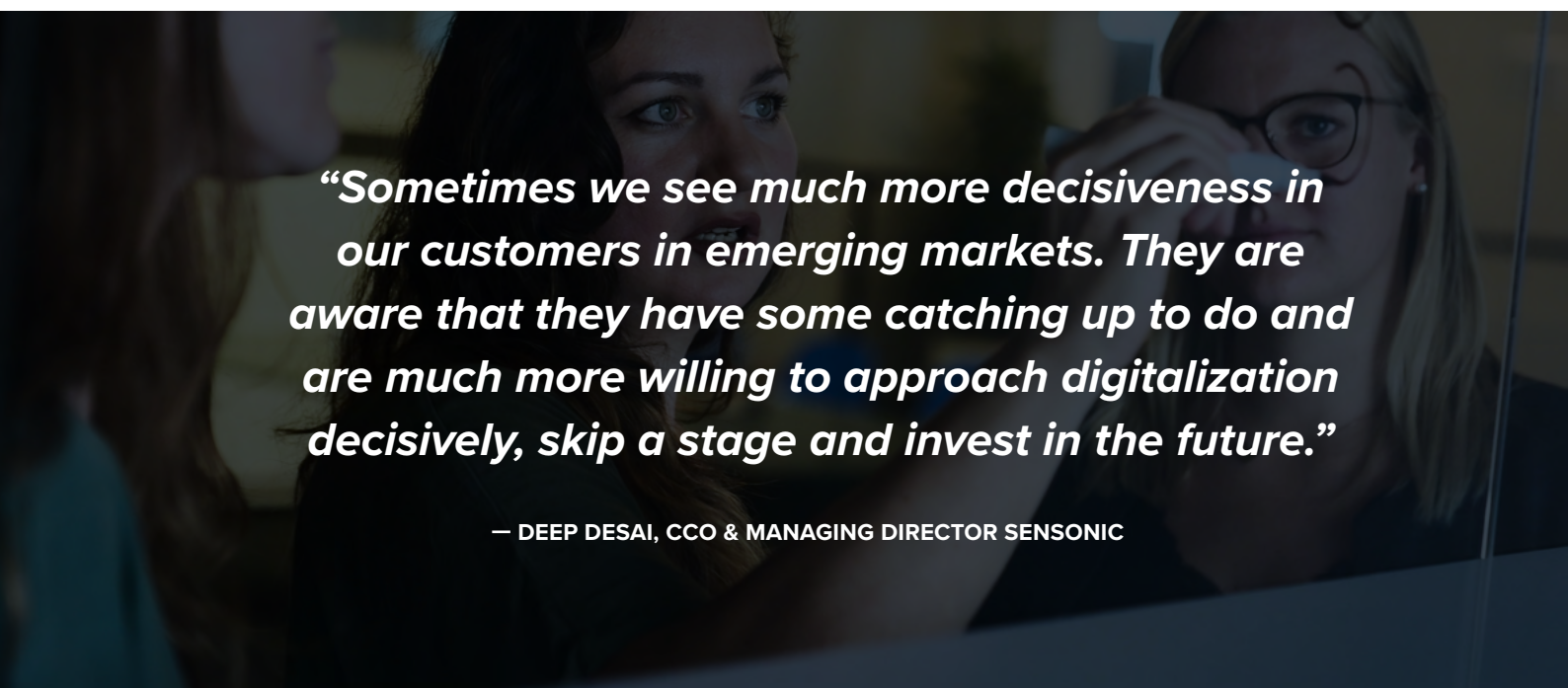
CATCH 22

Proving the business case becomes a close-to-impossible change process requirement.



When it comes to monitoring solutions, e.g., the ability to prove a business case with real savings, rather than estimates, depends on the customer's ability to act on these findings. For example, the value of a monitoring solution for the customer might be the knowledge of what needs repairing and what does not, thus avoiding not only failures but also unnecessary inspections and maintenance. If that solution indicates that an asset is in good condition and does not require any preventative measures, in theory, the customer would save the money needed to inspect or maintain it preventatively.

Acting on these findings in reality, however, requires formally changing processes, and the initiation of process change itself requires a proven business case. This approach makes technology adoption incredibly slow as functioning solutions are not being explored to their full potential due to the processes lagging behind. The overall sentiment that the respondents shared in the survey boiled down to the need to take bigger and bolder bets as transformation does not happen in incremental steps, but requires rethinking processes altogether. Some of the respondents added that this mindset is sometimes more prevalent in emerging markets as opposed to established ones.



“Sometimes we see much more decisiveness in our customers in emerging markets. They are aware that they have some catching up to do and are much more willing to approach digitalization decisively, skip a stage and invest in the future.”

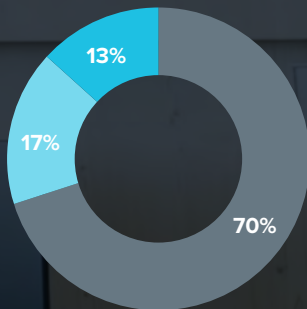
— DEEP DESAI, CCO & MANAGING DIRECTOR SENSONIC

THE PROMISES AND PERILS OF THE SOFTWARE-AS-A-SERVICE MODEL

Software-as-a-service (SaaS) is the preferred business model for many startups and for good reason. SaaS offers many advantages to both the startups and their customers. SaaS provides unprecedented speed and on-demand scalability. Without the need to set up server infrastructure, a SaaS solution starts providing insights immediately. A SaaS solution can readily and regularly offer users new and improved features. Moreover, when the system is based on machine learning, it learns not only from the local infrastructure, for example, but also from global customer data, accelerating the speed of improvement. Modern cloud-based architectures, on which most SaaS systems are built, remove the risk of sunken costs associated with complex IT setup, technological obsolescence and their supporting infrastructure, or generally under-managed systems. When it comes to security, global cloud providers such as AWS have state-of-the-art security in place, often proven to be superior to most on-premise solutions. Finally, the SaaS model is cost-effective, minimizing large upfront capital investments and further reducing ongoing operational and personnel costs.

Taking all of the above into account, SaaS appears to be the obvious choice for many railway customers. The reality is, however, that railway is an industry, where state funds often come in the form of capital investments. That creates a certain preference for financing innovation in the form of capital expenditure (CAPEX). Conversely, SaaS with its service subscriptions requires budgets under operational expenditure. That primarily accounting driven dynamic creates an issue — OPEX budgets are scarce and very competitive, creating little incentives for rail companies to invest in buying into SaaS solutions. Instead, railway companies are more likely to embark on a journey of purchasing equipment and initiating in-house projects in order to extract actionable insights from the data these equipment generate.

The respondents' position on the Software-as-a-Service (SaaS) model



- It is an integral part of our strategy
- It is an ambition, but we are considering other models too
- We do not believe that SaaS is a viable business model for us

“All our OPEX budget was spent by April 1st this year, we have no OPEX to spend on digital services.”

— A CUSTOMER

BIGGEST OPPORTUNITIES TO ACCELERATE DIGITALIZATION

There is a big opportunity for the railway industry to benefit from new digital technologies and for the creation of new technology companies but the environment needs to change to make this happen faster. Rail is one of the most environmentally friendly means of transport for both passengers and freight. According to Statista, the global railway tech market is expected to reach an annual value of €185bn. Startups, to a greater degree, are recognizing this opportunity and embracing new technologies in the industry.

The global railway tech market is expected to reach an annual value of

€185bn

The total investment in companies that participated in this survey is over

€170M

As companies increasingly invest in digital solutions for railway operators and infrastructure managers, we do see different patterns between developed and emerging markets. Emerging markets such as Brazil and India sometimes adopt digital solutions quicker and more flexible. This is due to the fact that they do not have the same rigid processes in place, and are willing to jump to the newest generation of rail technology available in order to close the gap to the developed markets faster.

The introduction of more digital technology within the rail industry is without a doubt transforming operations and offering new ways for the industry to operate. The launch of these new technologies not only improves mobility but also works towards reducing costs which continue to boost the overall appeal of rail as a means of transportation.

“An ecosystem of digital solutions can boost productivity and efficiency in the sector, while also making rail more attractive for new talents. We as startups have a responsibility in this story and need to collaborate and drive innovation together to help build this sustainable future.”

— FABIAN STÖFFLER, CO-FOUNDER & CEO MENLO79 GMBH

Should you like to participate in our future survey and join our community of startups in the rail industry, please get in touch with KONUX at marketing@konux.de. We're also excited to meet you at the [events](#) we are participating in.

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