

Yakov and Partners ×  zyfra

Digitalization of the Russian metals and mining industry in 2024

Long-term optimism and ambitious goals

Nikita Natrusov, Ilya Sadardinov, and Sergey Yemelchenkov

April 2024

Dear readers,

We are happy to present our second report on digitalization in the Russian metals and mining industry. In 2024, our study focused on opinions of Russian companies about their digital transformation performance and prospects.

The market for digital solutions has, on the whole, adapted to the current geopolitical landscape, demonstrating a steadily growing optimism about the digital transformation of the industry. Although Russian players continue to have high ambitions and expectations about the impact from going digital, only 50% of them meet their digitalization targets. Almost half of respondents said short-term initiatives in their key industrial operations have already been utilized to their maximum potential, citing this as one of the key reasons for a failure to meet their targets. Opportunities for improving performance can be seized by ensuring transition to long-term impact planning and including support functions in the implementation scope. For instance, digitalization projects in supply chain management, repair and maintenance, and corporate and commercial functions contribute 60 to 75% of the impact achieved by foreign companies, which at the same time implement technologies in manufacturing with a long payback period. Also, Russian players should put a greater emphasis on building organizational flexibility, which requires a change in internal processes, and enhancing digital competencies, which have become even scarcer over the past year.

For this issue of the report, we have also synthesized opinions of market players and experts about four high-potential technologies that are popular among companies in foreign markets: self-driving trucks, integrated remote operations centers (IROC), digital twins, and generative AI.

The report is based on results obtained from a survey and a series of interviews with executives from Russian metals and mining companies, as well as foreign experts. The survey included 130 respondents from more than 50 companies.

We hope that the insights provided in this report will help the Russian metals and mining sector to more effectively implement its ambitious future plans for digitalization.



Nikita Natrusov
Partner
Yakov and Partners



Ilya Sadardinov
Partner
Yakov and Partners



Sergey Yemelchenkov
CEO
Zyfra

Contents

01

Current trends
and challenges



02

Potential
digitalization
scenarios



03

Examples of
digital
technologies



What have leading Russian companies achieved over the past year?



“

The industry has recovered from shock and keeps moving forward

CEO

“

The main process stages where we could achieve impact were covered by both foreign and Russian vendors

Head of IT Projects

“

Our target for productivity improvement in processing was +2%, and we did +2.4%

Digitalization and Automation Director

“

We've launched a language model prototype for taxes and accounting and improved productivity by reducing the time to search for information by one and a half to two times

Chief Digital Officer

“

After our Western vendors had left, we hired programming staff who are now implementing software integration across operations using Python scripts

Mining Director

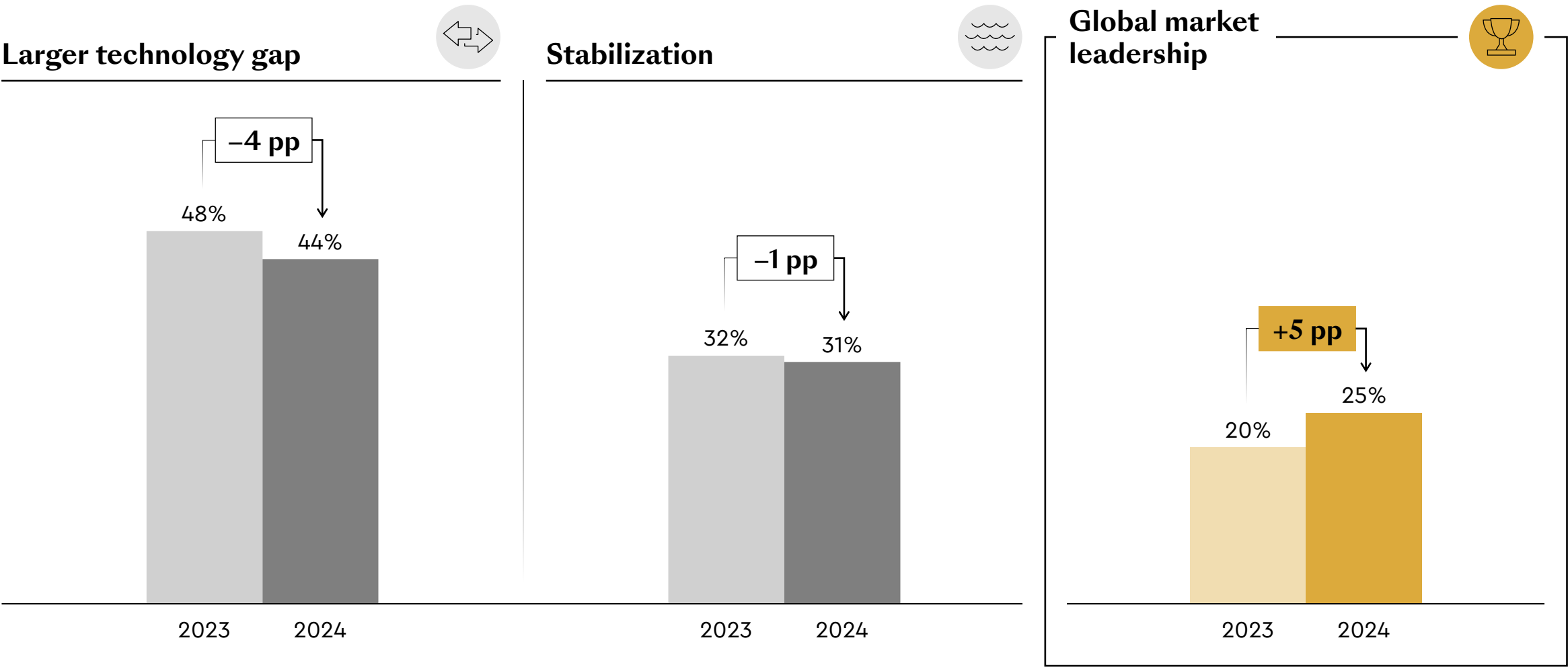
“

We reached only 50% of the target, but this was mostly due to our internal inefficiencies

Deputy Chief Technical Officer

A note of optimism: one in four respondents believe that Russia may become a global leader in digital technologies

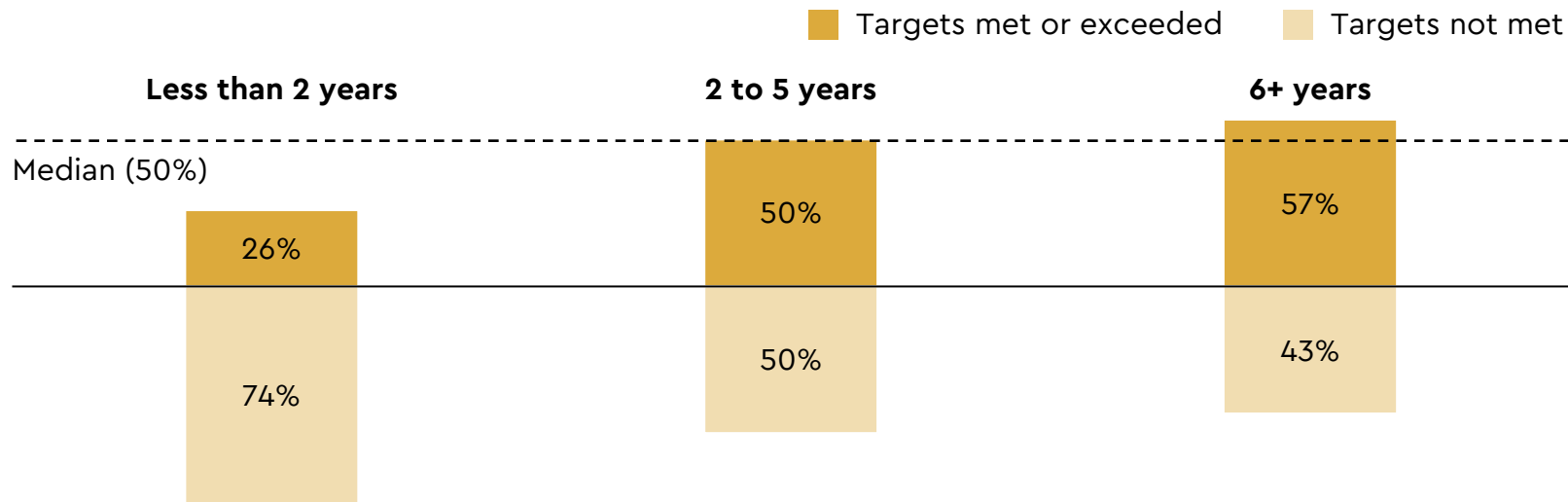
% of respondents expecting changes in digitalization¹



1. Question: "What are the prospects for digitalization and digital solutions in your company in the next three years?"

The share of respondents planning to enhance impact from going digital has grown almost fourfold despite modest results in 2023

Achievement of expected impact depending on the duration of digital transformation¹, % of respondents



Two-thirds of "first-timers" failed to meet their digitalization targets (the international benchmark is 70%) due to the following reasons:

- Setting expectations about implementation and impact timeframes too high
- Failure to set up seamless internal processes and tracking for projects
- Difficulties with accessing the basic technologies that are no longer available in the Russian market

Key observations

Share of companies planning to increase impact from going digital in the next two to three years has grown almost fourfold in 2023

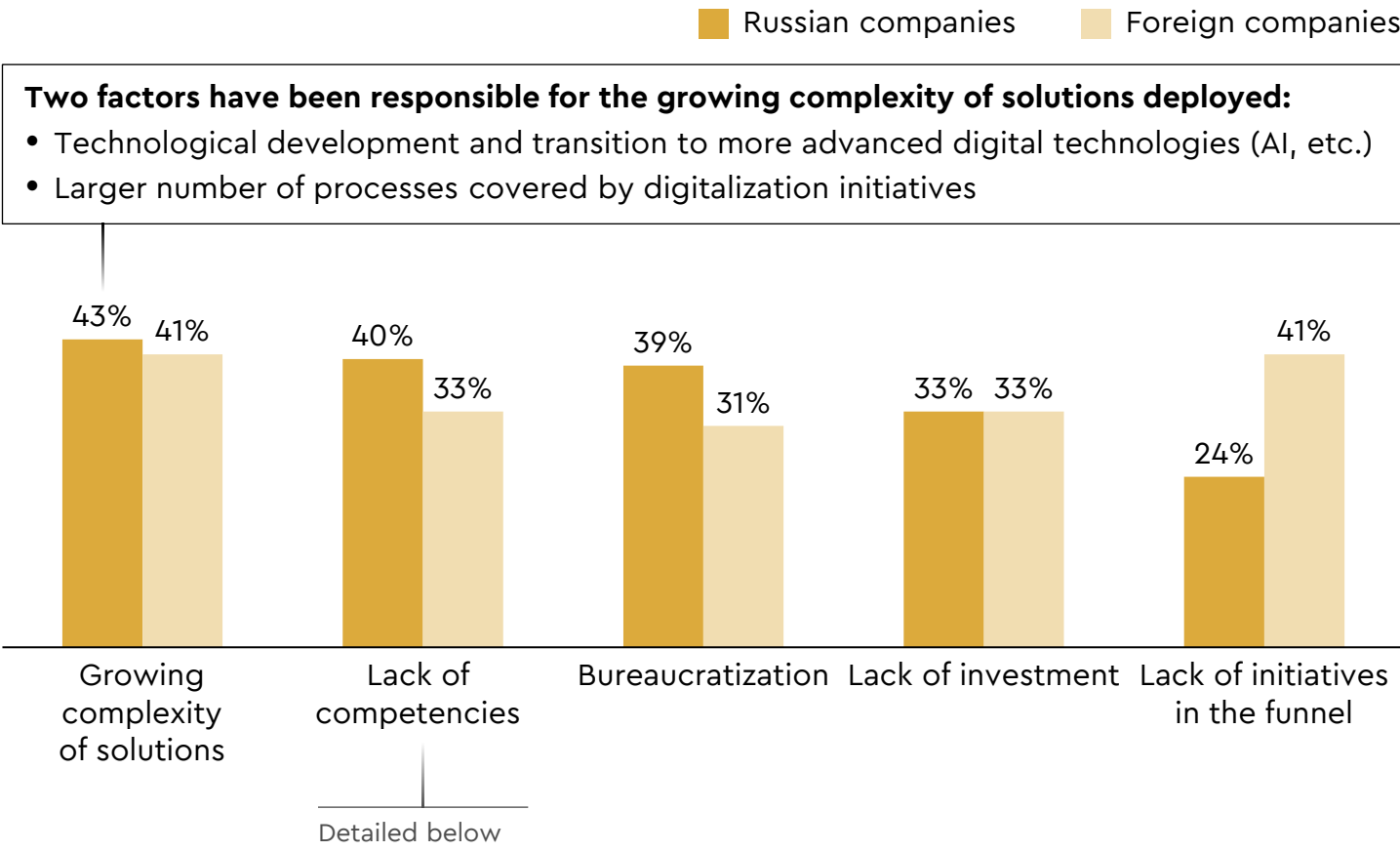
15% → **55%**
2023 → 2024

No respondents from companies implementing digital transformation for 6+ years reported plans to set lower impact targets

1. Questions: "What financial impact from digitalization have you achieved in 2023 vs. the target?", "For how many years has your company been implementing digital solutions and digital transformation?"

Key problem areas are lack of competencies, bureaucratization, and growing complexity of solutions

Problem areas identified when implementing digital solutions in 2024¹, % of respondents who mentioned the problem



Two factors have been responsible for the growing complexity of solutions deployed:

- Technological development and transition to more advanced digital technologies (AI, etc.)
- Larger number of processes covered by digitalization initiatives

Detailed below

1. Question: "Which of the problem areas listed below have most critically affected the achievement of impact from digital solutions in your company?"



The funnel is smaller now because the initiatives get more sophisticated and more high-tech, and basic digital solutions are not enough

Chief Information Officer



There is a serious shortage of developers: it's not easy to get them interested in working in the mining industry

Mining Director



We are a large, heavily bureaucratized company with more than 400 regulations

Chief Digitalization Officer



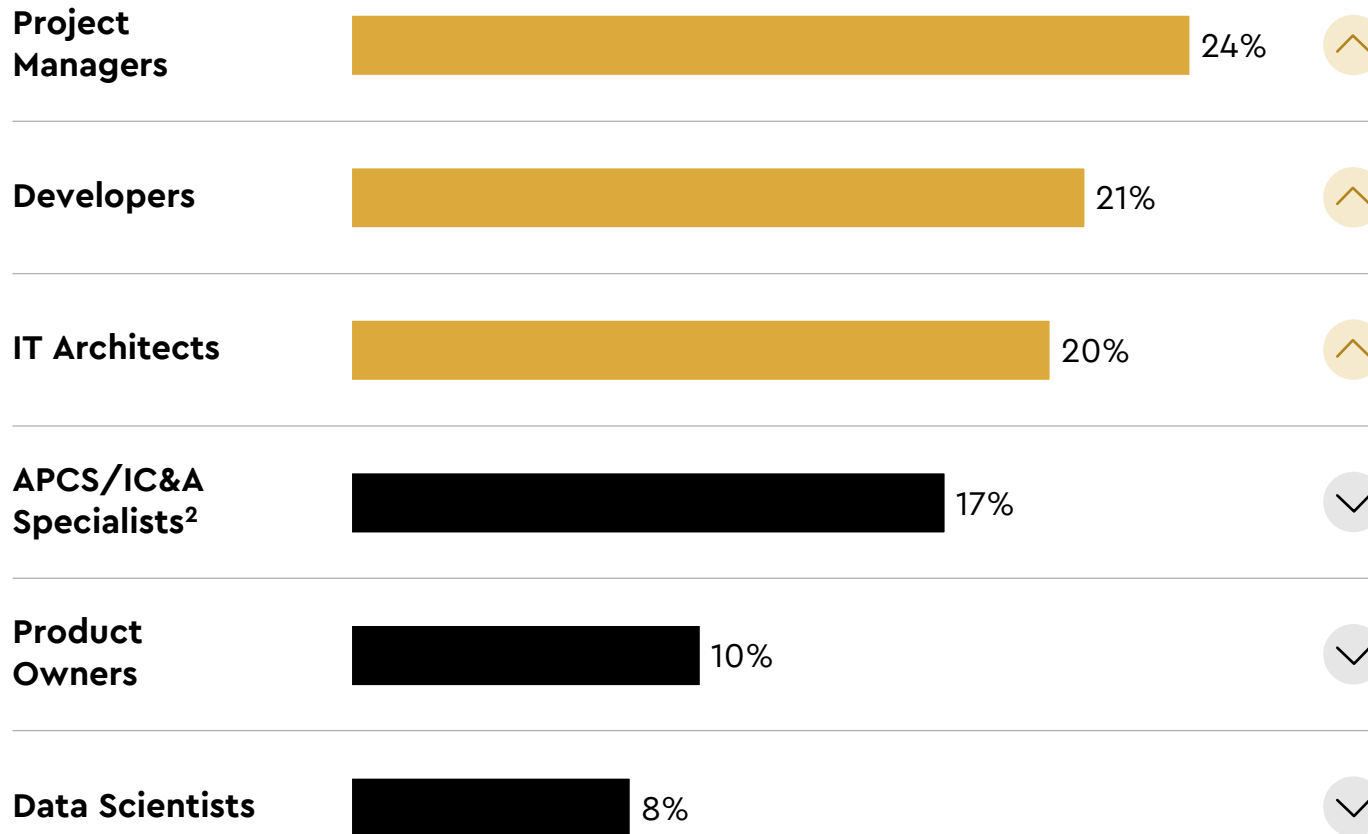
We've started implementing more initiatives than we could handle, that's why the implementation process has slowed down

Head of IT Projects

Workforce shortages are getting worse in 3 out of 6 job categories, with project managers being the most undersupplied group

Dynamic vs. 2023 ⬆️ Gap increased ⬆️ Gap decreased

Top critically undersupplied jobs in 2024¹, % of responses given



Key observations

1 **IT project managers** are increasingly in short supply due to mounting competition from technology giants and growing demand for seasoned "change drivers" as projects become progressively more complex

2 The workforce gap has shrunk somewhat in the job category of **APCS/IC&A Specialist²**

The categories of **Product Owner** and **Data Scientist**, which were critically undersupplied before, have seen their staffing gap very nearly bridged as external contractors saturated the market (only 16% of respondents reported a shortage)

1. Question: "From the list below, which are the three job categories crucial to digitalization projects in which most acute staffing shortages are felt by your company?"

2. Automated Process Control Systems / Instrumentation Control & Automation

What next?

”

It seems that, as a **brand**, digital transformation **is on its way out**. This is the case in Russia and the rest of the world. So now, **something new has to replace it for executives** and shareholders. **Something new** is in fact **materializing**, but **not systematically enough**.

For us, it manifests itself in **workplace transformation**, focus on **labor productivity**, and **data driven management** across the entire supply and production chain. Meanwhile, in our view, the **core** remains the same. It consists of **projects** generating **direct economic impact**

Chief IT Officer

”

We upgraded 1980s legacy APCS¹ for about 15 years. Then we were swept over by this digital transformation wave. **Some things took root, others didn't**, but the key outcome for us is our **strong digital team** ready to support and advance new projects.

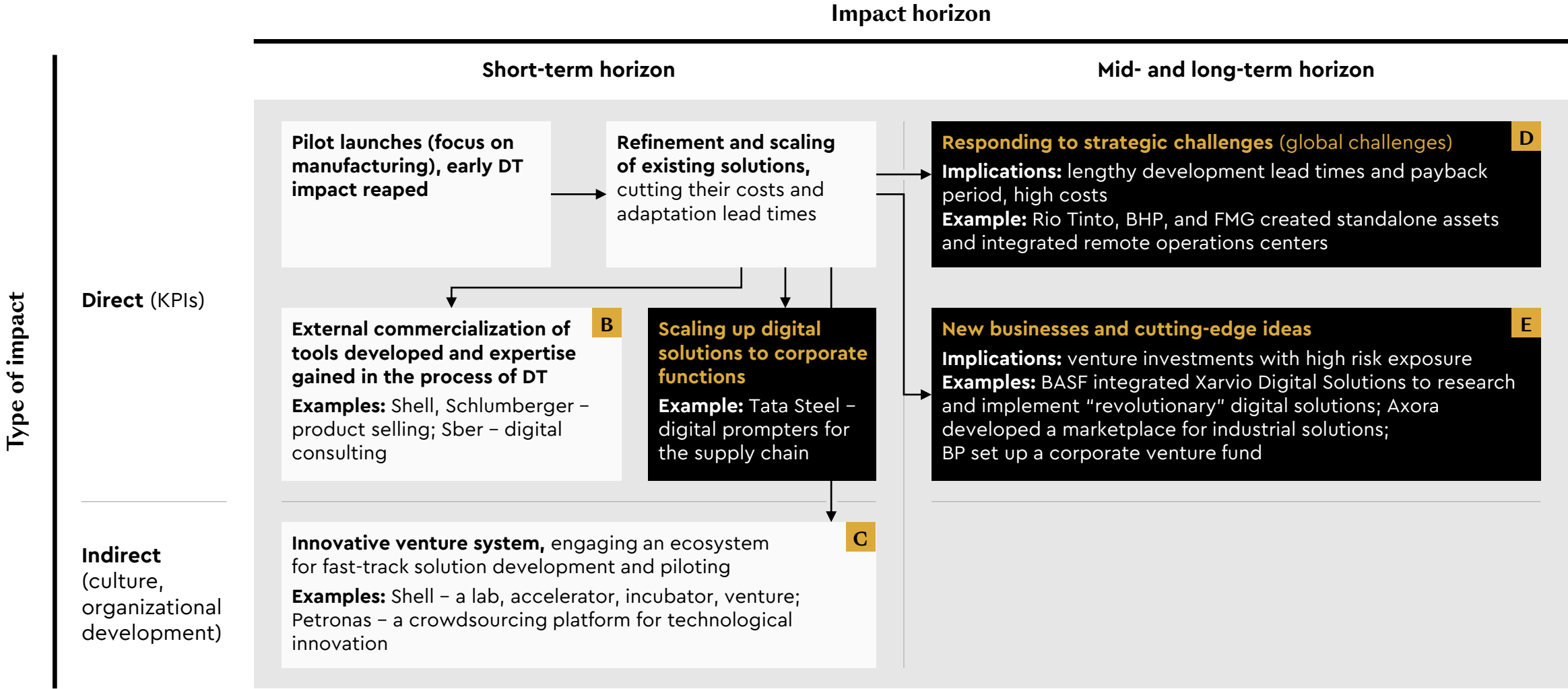
We've done our fair share of trial and error tackling the support and integration side of digitalization solutions. Nowadays we combine **digital transformation, APCS and technology development** in a bid to achieve **a sustainable impact**

Chief Digitalization Officer

1. Automated Process Control Systems

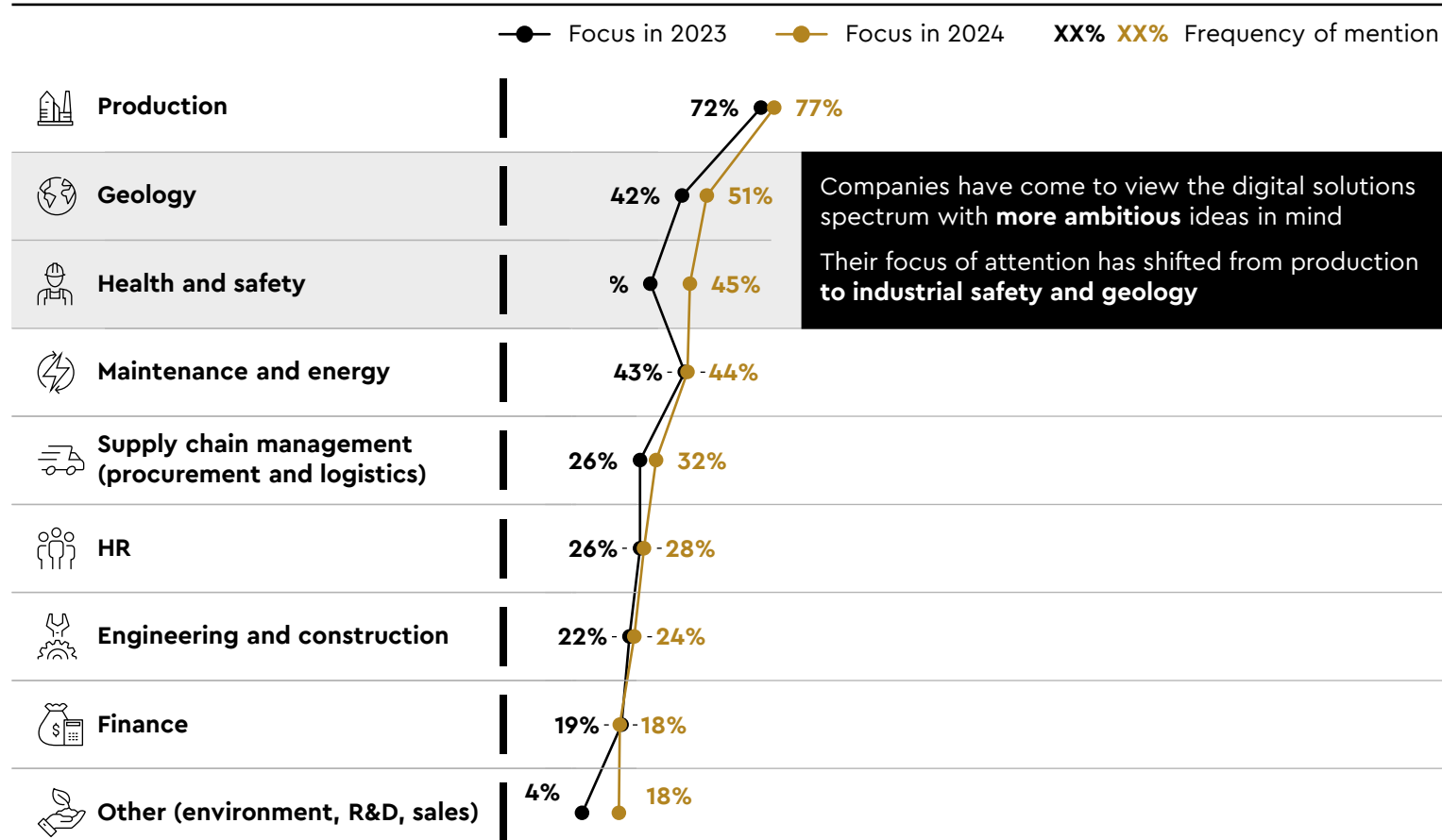
Taking digitalization further: five possible archetypes

Detailed below

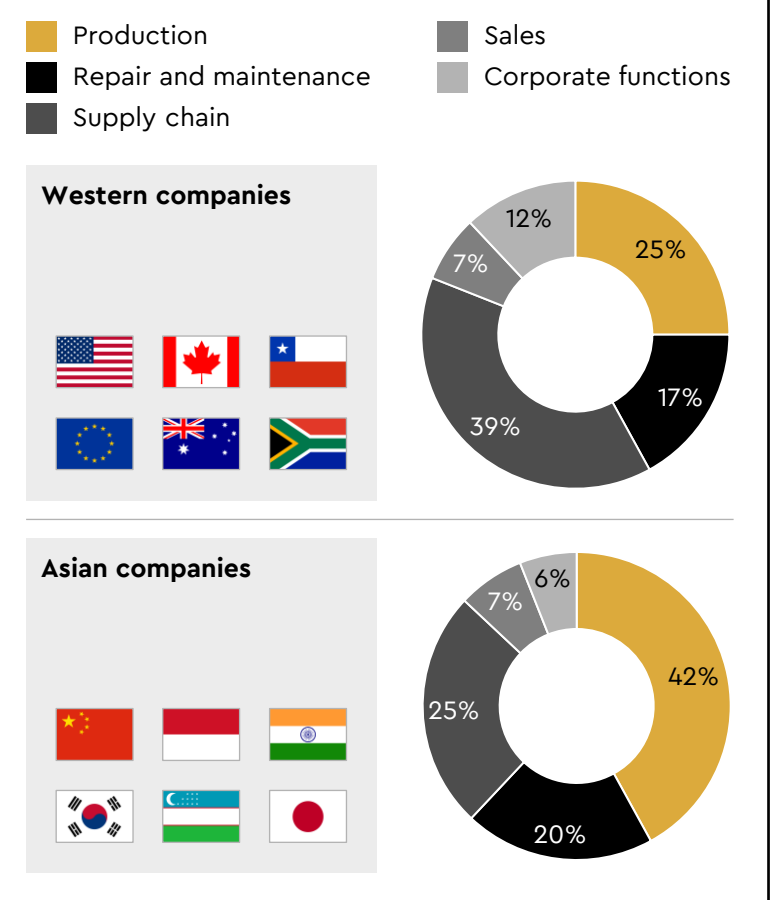


Production processes will remain the primary digitalization focus for Russian players in the next three years. Meanwhile, their international peers spread their digitalization initiatives to corporate functions – and get great results

Solution uptake by function¹, % of respondents who mentioned the function



How digital transformation impacts EBITDA, % of overall economic impact²



1. Question: "Which top 5 functions does your company view as digitalization priorities?"
2. Based on analysis of digitalization cases reported by international mining and metals companies

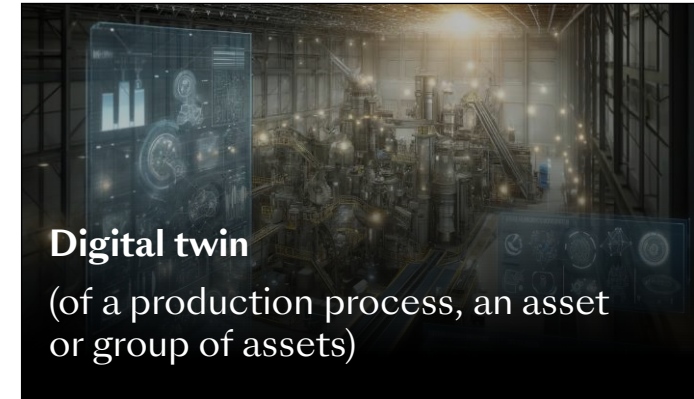
The majority of global metals and mining leaders are trialing or implementing sophisticated technology in their backbone production processes, despite the distant prospect of payback



Autonomous operation (case in point: self-driving dump trucks)



Integrated Remote Operations Center (IROC)



Digital twin (of a production process, an asset or group of assets)

Description

Self-driving dump trucks driven by algorithms
Goals: raise productivity, cut mining costs, reduce vehicle fleet

Centralized "mission control center" for the production chain
Goals: ensure balancing and end-to-end optimization, from mining to finished product shipping

Mathematical model of plants / process stages / entire chain
Goals: find and retain the optimal operating modes to maximize productivity and performance stability

Companies where the technology is at work

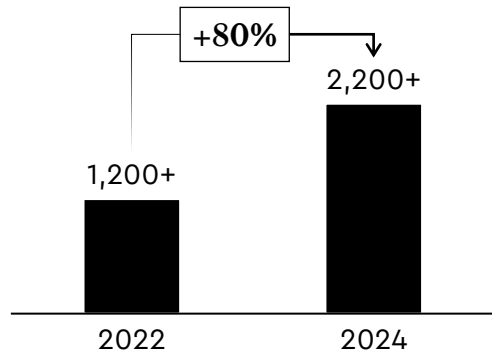
- Anglo American
- Antofagasta
- BHP
- Fortescue
- Newmont
- Rio Tinto
- Teck Resources
- Vale

- BHP
- Boliden
- Codelco
- Newcrest
- Rio Tinto

- Anglo American
- ArcelorMittal
- BHP
- Newmont
- Nippon Steel
- POSCO
- Rio Tinto
- Tata Steel
- Vale

The fleet of self-driving trucks is currently in transition to exponential growth worldwide as technology maturity increases and implementation success stories multiply

Global self-driving truck fleet



- ✓ **>90% of the fleet** operates in these three countries: Australia, Canada, and China
- ✓ **Six vendors with out-of-the-box solutions**¹: Caterpillar, Komatsu, SafeAI, ASI Mining, EACON, TAGE
- ✓ **>10 companies and startups** pursuing development

Key levers

Better productivity and reduced costs



Self-driving trucks need **no lunch breaks** or **shift changes**. They have a **better average speed** and keep unit **costs low for fuel and off-the-road tires**

Smaller fleet



Because of a better utilization rate and a steadier operating pace, the company will need **5% to 10% fewer trucks**

More careful operation



The autopilot will never overstrain the truck's components, which translates into a **longer running life**

1. Not exhaustive

Impact from implementation

+5%–10%

Better productivity

–5%–10%

Payroll costs down in mining

–3%–5%

Expenses down on fuel, lubricants, and off-the-road tires

+0%–5%

Longer equipment lifecycle

What Russian players think



First we did a feasibility study, and we found it was not worth it. It doesn't pay off or it takes too long, and there are all these infrastructure requirements to be met, coupled with the high costs of keeping it up as good as new. And the payback is pretty low

Director of Business System Development



There are stringent legal restrictions on the use of self-driving trucks in Russia: they cannot be used outside fully deserted road sections, and there is no fast-track option to launch a pilot

Deputy CTO

Remote control centers enable end-to-end optimization, but massive network and integration investment is required

Key levers

Centralized planning



The idea is that the IROC will **take over centralized planning**, while assets can focus their effort on **performance, safety, and prompt response action** in the event of emergency or irregularity

Integrated approach



End-to-end optimization decisions are the prerogative of key functions located **"in the same room"** and **within the same data loop**

Employees more productive, new talent onboarded



It becomes easier to bring **digital and analytical competencies** into an **improved, cross-functional work environment**

Responsibility and organization



Asset **leaders** have to live up to a higher **level of responsibility** as production **data** is now **transparent** and **accessible** in real time

Impact from implementation¹

+3%–5%

Better productivity

–0%–10%

Reduced in-process inventories and finished product stocks

–3%–5%

Reduced operating expenses

+1%–3%

Increased availability and reliability

What Russian players think



We are thinking along those lines, however, implementation still does not make much sense to us. We may want to try it like five years from now. We're just not ready so far

Chief Digitalization Officer



Adoption of this technology is first and foremost a question of data security. In fact, we've given up the use of cloud data channels – for the same reason

Chief Automation and Digitalization Officer

1. Estimated for a company operating multiple mining, processing, and logistic hubs

Digital twins are widely used in projects requiring the optimization of standalone mineral processing or metallurgical process stages or entire production chains

Key levers

Labor productivity and management improvements



With data processing and report preparation **tasks automated, more time is freed up** to focus on data analysis and key decision-making

End-to-end optimization



Better and timelier decision-making thanks to more data coming from production sites

Optimized modes



With a "twin," you are equipped to track down those **areas** where production shows **less than optimal performance**, and eliminate the **bottlenecks** in real time

Reduced downtime



The mathematical model uses sensor data to **anticipate breakdowns** and **reduce emergency downtime**

What-if analysis



The option becomes available to **test diverse scenarios** in search of the optimal equipment operation modes

Operator training



The twin is used as a **simulator** where operators can hone their work skills

Impact from implementation¹

+1%–2%

Better productivity / marketable output up

–3%–7%

Reduced operating expenses

+1%–3%

Increased availability and reliability

What Russian players think



There have been attempts to create a digital twin for a processing plant, but they didn't get very far with that

Deputy CTO



Thus far, we've been working on "miniature digital twins" for individual process stages

Director of Business System Development








Our current level of mental and industrial preparedness will not permit us to implement a digital twin to the full extent

Chief Digitalization and Automation Officer

1. Estimated for a company operating 5 or 6 major mining, processing, and metallurgical process assets

Despite the rapidly rising generative AI trend, GenAI has so far been used for big data organization, synthesis, and analytics only

GenAI use cases

Geology		Analysis of promising prospecting areas and generating new geological targets
Production		Prompt access to production data for management Training course design and up-to-date briefings for employees
Repair and maintenance		Predictive equipment maintenance based on data from multiple sources
Sales		Digital assistant with interactive sales scripts
Other		Assistant for management meetings Automated acceptance of improvement ideas Legal compliance prompter for fiscal and financial accounting and procurement Helpdesk chat bots for employees Wireless intercept and social media analysis to predict or investigate incidents Preparation of "first draft" reports and presentations Primary screening of job candidates

Impact from implementation¹



What Russian players think

“
The goal we've set ourselves is to do 10 to 15 GenAI projects this year. We believe that everyday use of these tools would be conducive to bringing about a change in corporate culture
VP, Chief IT Officer

“
I guess people are a little overenthusiastic about generative AI at this point, but this is not to say that it should be ignored
VP, Chief IT Officer

1. In some use cases

What are your plans and what next steps do you envision on the path toward digitalization?



We were given this task to work out truck robotization plans. It is now generally acknowledged that projects of this nature are not even meant to make money. They are all about filling the workforce gaps

Chief Digitalization Officer



There are still massive quantities of 'low-hanging fruit' out there. There exist process stages where digitalization is below 10%. The important part is to use the technology right once you have it in place

Chief Digitalization and IT Officer



We are not revising our next year's plans. We're firmly on track toward broadening the application of digital products

Deputy CTO



We're planning to launch a new production site soon to make better quality billets. It will be a fully automated production process

Deputy CTO



We have to update the processes, because right now we are trying to fit modern tools into obsolete processes

Vice President



In Russia, the digitalization paradigm has a short-term focus. You could devise a long-term strategy, but they're still going to ask your for results at year-end. It's our goal setting approach that needs to be changed

Vice President

All information contained in this document (hereinafter referred to as the "Study" or "Study Materials") is intended only for private informational noncommercial purposes and does not constitute professional advice or recommendations. Neither the information contained in the Study nor its use by any party shall create a contract, agreement, or other relationship between Yakov and Partners and any party that has received and is reviewing the Study Materials and/or any information contained in the Study. Yakov and Partners reserves the right to amend the information contained in the Study but assumes no obligation to update such information after the date indicated herein, notwithstanding that the information may become obsolete, inaccurate, or incomplete. Yakov and Partners gives no promise or guarantee regarding the accuracy, completeness, sufficiency, timeliness, or relevance of the information contained in the Study. Yakov and Partners has not carried out an independent verification of the data and assumptions used in the Study. Changes to the input data or assumptions could impact the analysis and conclusions presented in the Study. Yakov and Partners does not provide legal, statutory, accounting, financial, tax, or regulatory advice. Any party that has received and reviewed the Study Materials and/or any information contained in the Study bears liability for the receipt of independent advice in the aforementioned areas. Advice in the aforementioned areas may impact the analysis and conclusions presented in the Study. Nothing in the Study is intended as a recommendation to perform actions that could lead to a violation of any applicable law. Yakov and Partners does not provide opinions on the fairness or valuation of market transactions, and the Study Materials should not be relied upon or construed as such. Study Materials may contain forward-looking data (including, but not limited to, market, financial, and statistical data), the feasibility of which in the future is not assured and which are therefore associated with some difficult-to-predict risks and uncertainties. Actual future results and trends may differ materially from those described in the forward-looking statements due to a variety of different factors. If any person relies on the information contained in the Study Materials, they do so solely at their own risk. No guaranteed property rights can be derived from any type of information provided in the Study. To the maximum extent permitted by law (and except as otherwise agreed to in writing by Yakov and Partners), Yakov and Partners assumes no liability for any damages whatsoever that may be caused in any form to any person by the use, incompleteness, incorrectness, or irrelevance of any information contained in the Study. The Study Materials may not, in whole or in part, be distributed, copied or transferred to any person without the prior written consent of Yakov and Partners. The Study Materials are incomplete without an accompanying commentary and may not be relied upon as a separate document. Any party that has received and reviewed the Study Materials and/or any information contained in the Study hereby waives any rights and claims that it may have at any time against Yakov and Partners in respect of the Study, the information contained in the Study or other related Study Materials, conclusions or recommendations, including their accuracy and completeness. The product names, company logos and trademarks indicated in this document are protected by law. The receipt and review of this document shall be deemed consent to everything set out above.

Digitalization of the Russian metals and mining industry in 2024

Yakov and Partners production team:

Nikita Natrusov, Partner, Yakov and Partners
Ilya Sadardinov, Partner, Yakov and Partners
Alexander Koltyshev, Associate, Yakov and Partners
Ivan Dashchenko, Associate, Yakov and Partners
Vladimir Moskalenko, Associate, Yakov and Partners
Polina Gavrilova, Designer, Yakov and Partners
Sergey Kuznetsov, Managing Editor, Yakov and Partners

Zyfra production team:

Sergey Yemelchenkov, CEO, Zyfra
Lyudmila Grigoryeva, PR Director, Zyfra
Anna Malysheva, Marketing Manager, Zyfra
Tatiana Breigina, Digital Director, Zyfra
Konstantin Melnik, Head of Business Solutions, Zyfra

Yakov and Partners is an international consulting firm headquartered in Moscow, with offices in Dubai, Abu Dhabi, New Delhi, and Shanghai. Committed to addressing development challenges, we work shoulder to shoulder with leaders of various industries and the public sector. Together with them, we shape turning points in the history of companies and society, striving for sustainable results on a scale extending far beyond individual businesses.

Zyfra is leading the Russian market for industrial digitalization. It is a participant of the Ministry of Economic Development's priority project aimed at supporting private high-tech companies (National Champions). The company is also one of the country's most important IT firms. Zyfra helps improve performance and safety of manufacturing operations using industrial digital solutions and robotics. Zyfra's ecosystem of digital products and services combines proprietary and partner IT solutions for monitoring and managing manufacturing processes and equipment, which are available on a single platform, ZIIoT.

© Yakov and Partners, 2024. All rights reserved.

To contact the authors, request comments and clarifications, or check for any restrictions, please reach out to us at

media@yakov.partners

For more research, insights, and publications, please visit

www.yakov.partners



Yakov and Partners

© Yakov and Partners, 2024.
All rights reserved.

www.yakov.partners

 [YakovPartners](https://t.me/YakovPartners)

 [yakov.partners](https://wa.me/yakov.partners)

 [yakov-partners](https://in.linkedin.com/company/yakov-partners)



© Zyfra, 2024.
All rights reserved.

www.zyfra.com

 [Zyfra](https://t.me/Zyfra)

 [Zyfra_com](https://wa.me/Zyfra_com)

 [Zyfra_com](https://t.me/Zyfra_com)