

McKinsey
& Company

Generative AI: A boost for Operations

Webinar

18th of July 2023

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Meet our speakers today



**Nicolai
Müller**

McKinsey & Company
Senior Partner

*Lead European Operations
in Advanced Industries Hub*

“” *What are the
implications of GenAI
for the industry?*



**Marie
El Hoyek**

McKinsey & Company
Associate Partner

*Member of McKinsey's
Operations Practice*

“” *How do you imple-
ment GenAI use
cases at scale across
the organization?*



**Florian
Homann**

McKinsey & Company
Associate Partner

*Member of McKinsey's
Advanced Industries Practice*

“” *What use cases can
we already see today
to create value in
operations?*



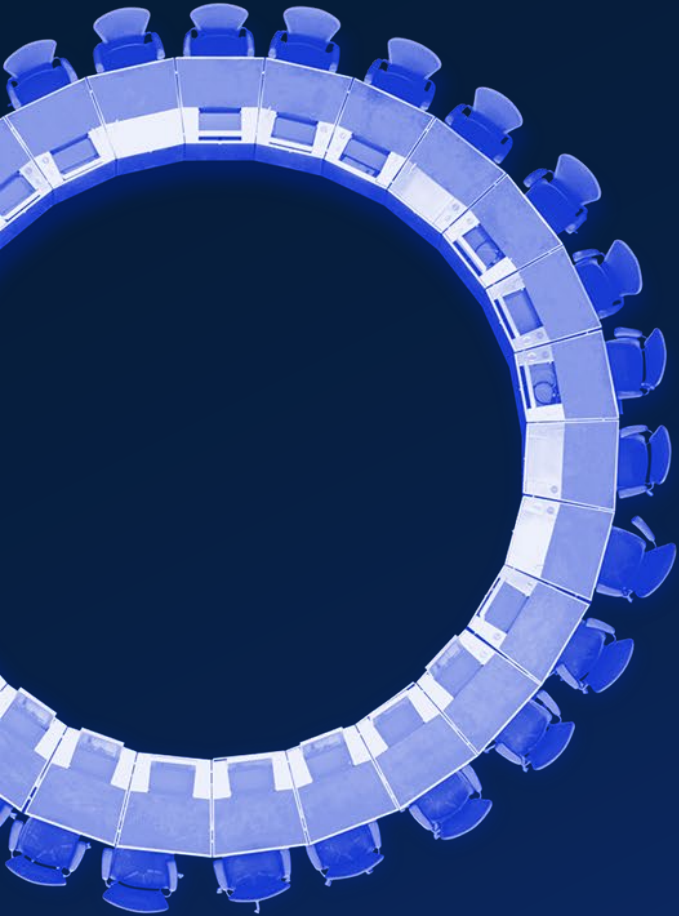
**Dominik
Grafenhofer**

Deutsche Telekom
Head of Predictive
Services & AI

*Lead Big Bet Voice
and Contact Analytics*

“” *How does Deutsche
Telekom implement
genAI in day-to-day
coaching & learning?*

Today's agenda



1



Introduction to genAI

2



Use cases

3



Deutsche Telekom - case example

4



How to get started?

We are potentially on the brink of a **societal transformation** at similar magnitude as the impact of the internet driven by **Generative AI** – **how may this affect the industry?**



“ ” We see enormous potential in this space to affect virtually everything we do... It will affect every product and every service that we have.

— Tim Cook

“ ” The development of [Generative] AI is as fundamental as the creation of the microprocessor, the personal computer, the Internet, and the mobile phone.

— Bill Gates

“ ” It's both positive or negative and has great, great promise, great capability.

— Elon Musk

genAI creates new content based on unstructured data, while traditional AI solves specific tasks within predefined boundaries



What is genAI?



Generating new data by learning from large data sets and identifying patterns within – capabilities include **text, visual, sound, etc.**

Can **predict likelihood** of a **right response**

Open-ended and creative

Examples:

ChatGPT by OpenAI – for text

StyleGAN¹ by NVIDIA – for visuals

NSynth by Google – for sound



VS

What is “traditional” AI?



Solving specific tasks by making predictions based on previously analyzed sets of data and **predefined rules**

Can **recognize patterns** in data

Goal-oriented and specific

Examples:

Voice assistants

Text recognition / OCR

Recommender systems

1. Generative Adversarial Network (GAN) = AI algorithm for generation of highly realistic pictures

genAI unlocks three unique abilities enabled by its ability to do things that “traditional” AI cannot

Rapidly increasing interest in genAI

675%

increase in VC investment in genAI since 2020¹

50X

growth in search for “Generative AI” in past year²

~80%

of current AI research is focused on genAI³

Generative AI is...

Fast



Model can be **deployed out-of-the-box** with only minimal training

Scalable



Same model can be **used across multiple use-cases**

‘Humanlike’



Model can **handle much more complex situations** and adjust its response accordingly



And able to handle...

Insight extraction

Rapidly search large corpora of text, visuals, etc., and identify relevant patterns

Content generation

Develop complex data tailored to specific context – in text, visual, sound, etc.

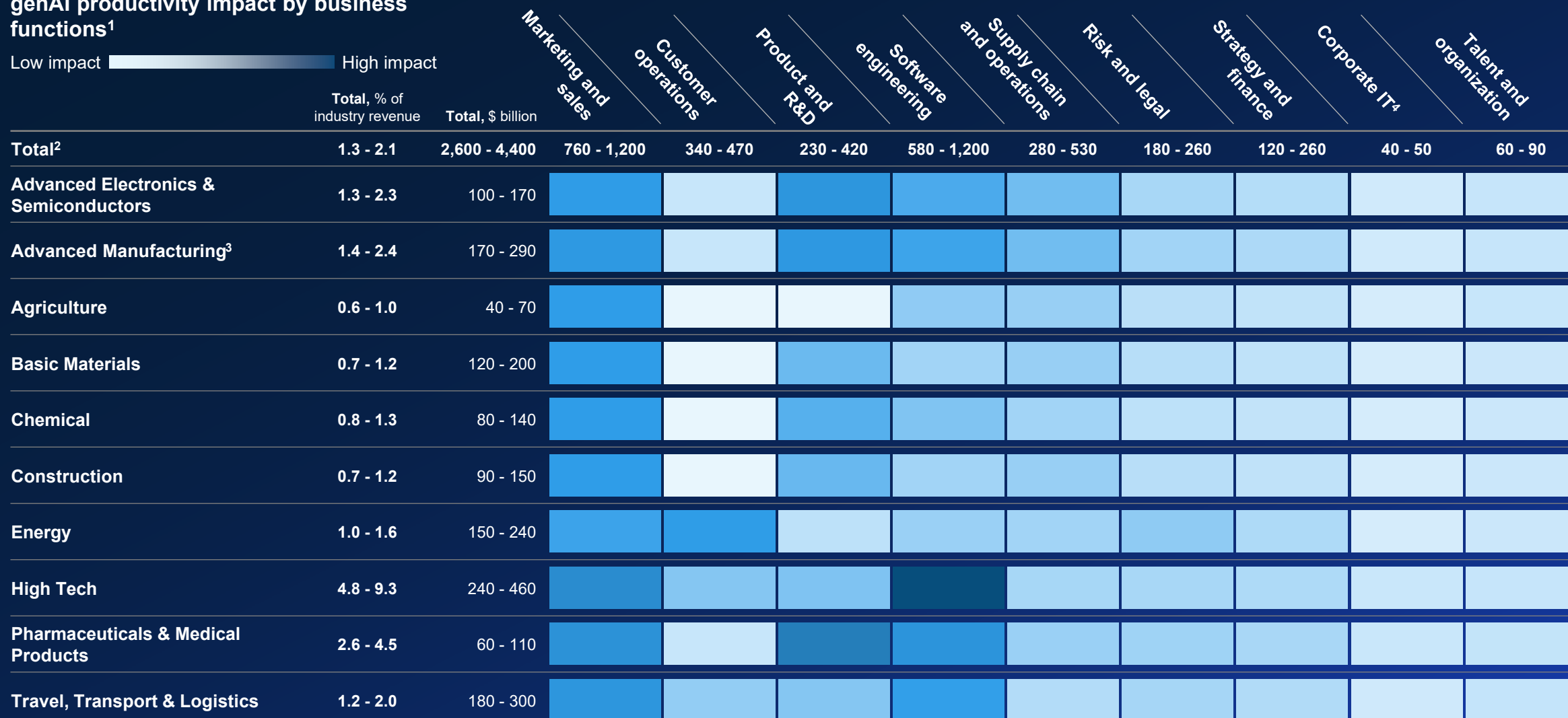
User interaction

‘Out-of-the-box’ humanlike conversational ability incl. context memory

Biggest impact of genAI use cases expected for marketing and sales as well as product and R&D functions

genAI productivity impact by business functions¹

Low impact  High impact



Note: Figures may not sum to 100% because of rounding.

1. Excludes implementation costs (e.g., training, licenses).

2. Across 21 analyzed industries – only excerpt shown here.

3. Includes aerospace, defense, and auto manufacturing.

However, this technological advancement comes with risks – effective genAI governance necessary to manage these

Not exhaustive

Fairness & bias

Inherited biases from training data can be amplified by the AI and lead to unfair outputs (e.g., discrimination)



IP risks

genAI might create **content infringing on existing IP** or lead to data breaches in case of external computation of data



Regulatory compliance

Data used **without consent** can lead to **privacy breaches** (e.g., GDPR)



Homogeneity

Many end users relying on the same genAI model will **spread negative impact** of any issues **across large parts of the organization**



Hallucination

Model might provide **false answers** without sharing that it is uncertain in the answer (e.g., in case it does not understand the question)



Safety

AI systems that are **not properly tested** at deployment can **lead to accidents**, particularly in transportation and manufacturing



Talent

Industries will be disrupted and new genAI specific roles that **require new skillset** emerge

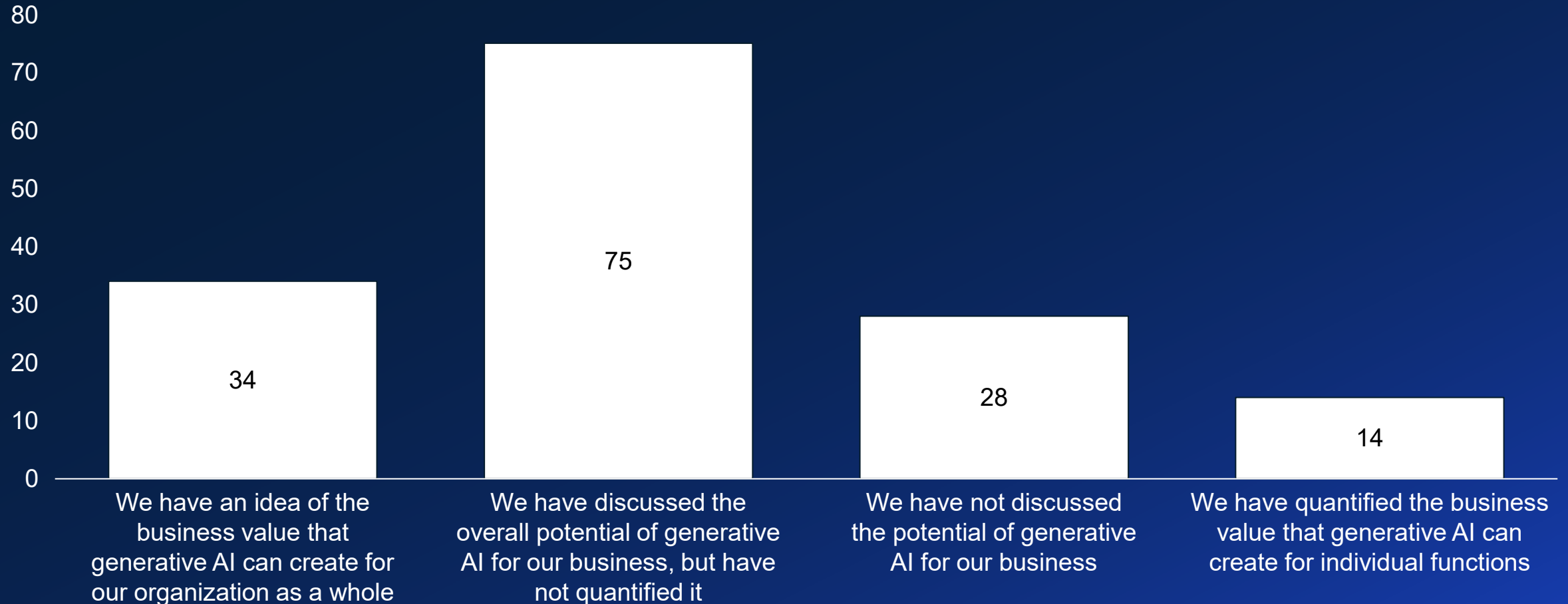
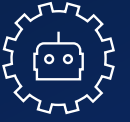


Interpretability

Insufficient explanations about specific outputs **make effective compliance** more challenging

Q1: Have you investigated the potential of Generative AI for your company?

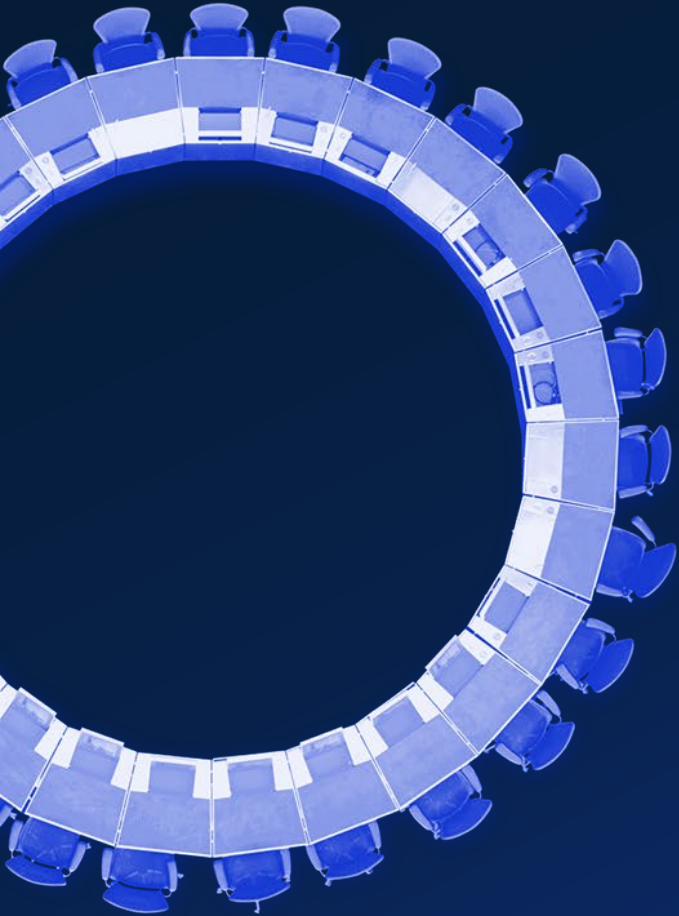
Most attendees are aware of potential benefits of Gen AI but struggle to measure the actual impact on their businesses



Graph does not include responses from internal participants

Source: Generative AI, a boost for operations webinar report

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Deutsche Telekom - case example

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How to get started?

Business | genAI offers value-creating opportunities across all functions of the ops value chain

Potential genAI use cases

Not exhaustive

Details in appendix



Use case detailed next






Customer engagement

Content generation

R&D	Procurement	Supply chain	Manufacturing	Marketing & sales	Aftersales & services	Back office, legal, HR & finance
Automate development of products and business models	Select most reliable and cost-effective suppliers	Generate optimized routes by analyzing historic and live traffic data	Automate design of layouts for warehouses and shop floors	Create product user guides (e.g., machinery manuals)	Create optimized service scheduling based on technician availability	Create meeting minutes in real-time in various languages
Automatically generate 3D designs for new products	Automate manual processes in procurement (e.g., RFQ creation)	Produce forecast demand scenarios by analyzing past sales and seasonal trends	Identify production anomalies through production data simulation	Forecast sales scenarios and help setting accurate targets	Analyze customer feedback by extracting themes from text and images	Prepare employee trainings including text and visual materials
Accelerate coding and overall software generation	Conduct supplier risk assessments (e.g., financial data analysis)	Generate-risk scenarios (e.g., disasters) and proactively suggest mitigation steps	Create digital twin to enable predictive maintenance	Create marketing and sales content, including text, images, etc.	Automate troubleshooting of products (e.g., through chat and visuals)	Provide self-serve HR functions (e.g., automated onboarding, Q&As)
Automate product requirements management	I Create holistic picture of supplier base incl. supplier specifications	Uncover potential bottlenecks across supply chain	Enable intelligent factory planning (e.g., control processes)	Improve self-service customer support chatbots	Coach call center agents to enhance competencies based on transcript analysis	Assist in recruiting (e.g., job postings)
Synthesize unstructured knowledge	Automate negotiations with tail-end suppliers (e.g., via email)		II Boost machine uptime with GenAI maintenance advisor		II Provide step-by-step maintenance advice to technicians and customers	Enhance contract management (e.g., creation and queries)
Enhance general productivity (e.g., automated meeting notes, email replies, to-do-lists)						


Gen AI can lead 3 types of impact: Automation, augmentation, and innovation

■ ■ Use case detailed next


	Automation 	Augmentation 	Innovation 
Definition	Automating manual tasks that could not be automated before	Enabling humans to do work more effectively and achieve better results	Creating new types of product and service innovations based on the new technology

Exemplary applications

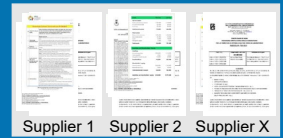
Molecule design in Pharma R&D



Generative 3D design in engineering




Summarize & synthesize knowledge



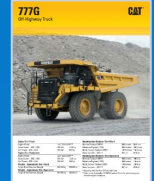
Coach call center agents



Summarize speech to text



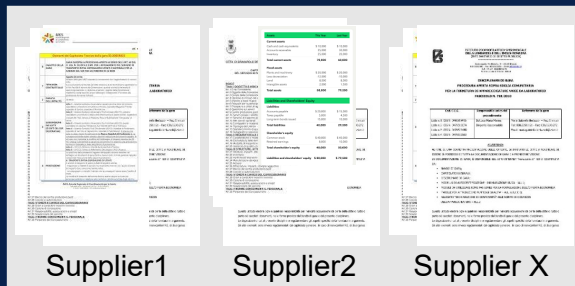
Maintenance advisor for internal and external service technicians



I: Use Case | Extraction of a structured summary from a large amount of heterogeneous information to make better decisions, faster

Inputs

- **Technical specifications** (technical aspects of products or services)
- **Project plan** (proposed timeline, budget, resources,..)
- **Quality control plan** (quality control processes, testing procedures)
- **Financial statements**
- **References of past projects**
- **Quality and other certifications**
- ...



genAI
model



Output

- **Structured summary view** with key information for each supplier

	Price, k€	Tech specs	Environmental compliance	Quality certifications	References	Additional notes
Supplier 1	200	Compliant	Environmental management plan developed	v	2 similar projects in the last 2 years	-
Supplier 2	400	Compliant	No environmental impact assessment conducted	v	1 project in adjacent sector	Proposed schedule not compliant with the required timelines
Supplier 3	150	Not compliant	Waste management plan missing	x	not relevant infos found	Low financial liquidity
Supplier 4	300	Compliant	...	x	not relevant infos found	-
Supplier 5	200	Not compliant	...	v	not relevant infos found	-
...	...	Not compliant	No environmental impact assessment conducted	v	1 similar projects more than 2 years ago	Tensile strenght of component xxx outside specs tolerances
Supplier X	200	Compliant	Environmental management plan developed	v	not relevant infos found	-

II: Use Case | AI Maintenance Advisor answering questions about a CAT 777 operating manual

Context

Support for maintenance professionals

Technicians leverage genAI for real-time maintenance assistance

Based on McKinsey demo

Step 1: Assemble unstructured data

264 Page PDF operating manual



Step 2: Integrate with an LLM



1. Select the relevant LLM base model (e.g., GPT4, Bloom)
2. Split the manual into searchable chunks
3. Create prompt-embedding logic (so the question can be linked to the document)
4. Setup semantic search
5. Generate responses

Step 3: Validate and refine

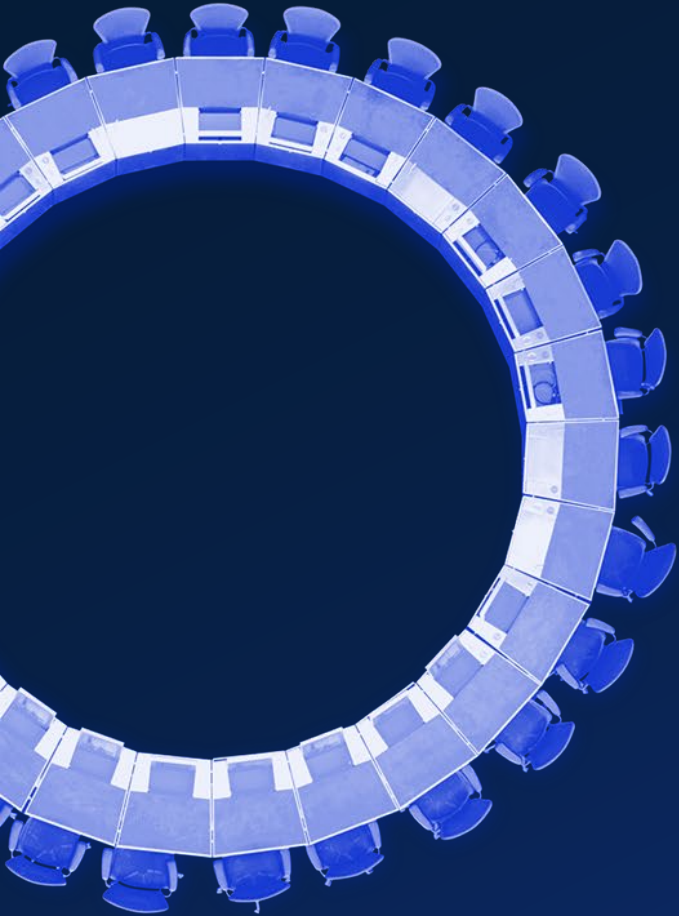
Prompt: “Describe the preventative maintenance needed for the CAT 777 haul truck. Please include examples related to tires.”

Answer:

- “[...]”
- *Check tire conditions: Inflate the tires to the correct pressure and consult your tire dealer for operating pressures. Refer to the Operation and Maintenance Manual for information on tire inflation and tire information (Source: page-117).*
- *Avoid operating the machine in conditions that can lead to tipping or damage: This includes working on hills, banks, slopes, or crossing ditches, ridges, or other unexpected obstacles at excessive speeds (Source: page-30).*
- “[...]”
- *Use wheel chocks: Inspect the ground conditions around both front wheels to ensure that the wheel chocks will work in the required position. Place one wheel chock on the front of the tire and one on the back of the tire, positioning them firmly against the tire and square against the tire tread (Source: page-114).”*

CAT-777F-Dump-Truck-Operation-Manual.pdf

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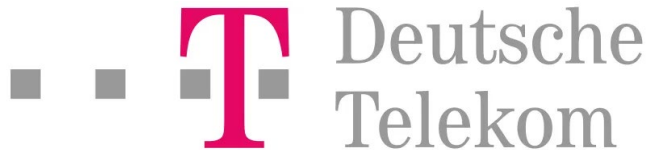
How to get started?

McKinsey
& Company

Call Center Coaching using Generative AI

Webinar

July 18th 2023



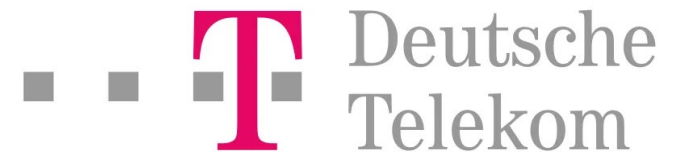
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Dr. Dominik Grafenhofer

Head of Predictive Services & AI



Deutsche Telekom Call Center operations



~60m

Consumer customers across copper, fiber and mobile within all of Germany

~34k

frontline employees with

~30%

outsourced and

~70%

inhouse

~40m

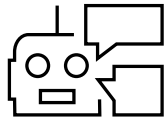
annual calls into the call center

The frontline make a sale every 4 seconds, generating

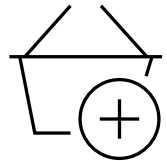
~€8 billion in yearly revenues

External and internal pressures are making frontline work more difficult...

Pressures on frontline agents created by internal change



By automating simple requests, the more complex queries remained for frontline agents



No. of products have increased and have become more complex, more knowledge is required to support



To reduce handover, frontline agent have converged into a 'one-stop shop'

... hence requiring increased attention to learning & development

Creating a 5-pillar approach within Deutsche Telekom to improve learning & development focus



Learning culture



Learning in the flow of work



New learning & coaching formats



Data&AI/adaptive



Personalization

GenAI can help overcome many of the current limitations and constraints for coaching and training frontline colleagues

From extensive manual coaching assessments by call center managers...



Less than 5% of customer interaction is covered by quality assessments



Supervisors have different standards and focus areas for their teams



Trainings employees receive are extensive and only have ~10% relevance to the skills



Agents only receive generic hard skill and process training



... to automated, standardized and tracked coaching opportunities



But now we can automatically analyze 100% of customer interactions



All employees are assessed against the same quality bar



Employees receive highly tactical advice on how they could improve conversations and rephrase sentences



Agents also get personalized coaching on their soft skills



... which will result into significant business impact for the call center¹

10-15%

improvement in call center agent performance

20-30%

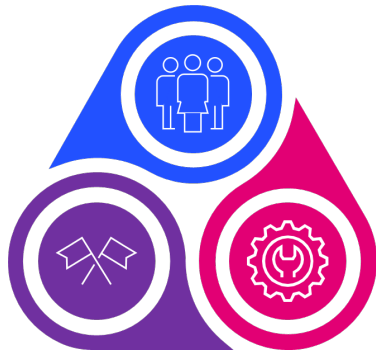
increase of customer satisfaction

15-20%

increase in First Time Right resolution

1. Ambition

The GenAI solution we developed analyses call transcripts on three parts:
‘soft skills’, ‘hard skills’
and ‘red & gold flags’



Soft skills

~14
Competency
dimensions

For example;

- Professionalism,
- Process transparency,
- Empathy

Hard skills

~6
Competency
dimensions

For example;

- Service to sales conversion,
- Process knowledge
- Compliance adherence

Red & Gold flags

>10
Reference items

Red flags example;

- “I've told you ten times that we need your signature, and if you can't understand, we can end the call here and I'll just hang up”

Example of extreme synthetic call center transcript

Call context: Customer has two questions;

1. Wants to return a defective device
2. Wants to know the status of a simcard order

Client Hello, I have a received a smartwatch with my contract, which is called the 'Explorer X'. The problem is that the battery does not last long. what can we do about it?
Agent Sounds like a defect, do you have the serial number of the device?
Client I don't have the packaging at hand right now, but I can look it up.
Agent **The serial number is either on the packaging, the delivery bill or the invoice.**
Client Here it is \"potential ID!\"
Agent Thank you, I will create a return slip to send it back and then we will send you a new device.
Client That's good to know, of course.
Agent **No problem, we'll take care of it. I will process this briefly. That means you might already get a return slip in your inbox. You would have to print it out and then stick it on the outside of the box. That then can go via postal services free of charge and we will receive it. Once it's received, it's checked briefly if all is correct and then you will get a new device sent to you.**
Client Okay, thank you. Maybe one more quick question again, last Saturday, I ordered another prepaid internet card. I wanted to check if it's gone out yet or if you could see where it is.
Agent You haven't received the card yet?
Client No, it's not there, that's why and then in the email I couldn't use the tracking because that didn't work.
Agent You can easily check the purchase status online, using the order number
Client Well, the link doesn't seem to work
Agent **Its really easy, anyone within your household who could help with that?**
Client No, not really
Agent Ok, let me have a look then. Ok, looks like its processed on Monday so its still on its way. It should get there tomorrow or otherwise the next day as it typically takes up to 2 days
Client Ok great, then we have solved all the problems for now.
Agent **I'm glad to hear that. I have a small request for you: if you get a text message from us tomorrow, please rate me. It would be nice if you could indicate that I solved the problem and also that you have heard an offer here and that you would recommend me as a staff member, as it will help my further employment**
Client Yes, we can do that.
Agent Great, thank you very much, stay healthy and I wish you happy holidays.
Client Yes, thank you. Goodbye

→ “The serial number is either on the packaging, the delivery bill or the invoice”

✓ High content knowledge

→ “Its really easy, anyone within your household who could help with that?”

✗ Low empathy

Example scoring output

Soft skills:

Empathy: Low

Process transparency: High

Professionalism: Medium¹

Other skills: No read

Hard skills:

Service-to-sales: No

Process knowledge: High

Other skills: No read

Red & gold flags:

Red flag; soliciting specific survey scoring

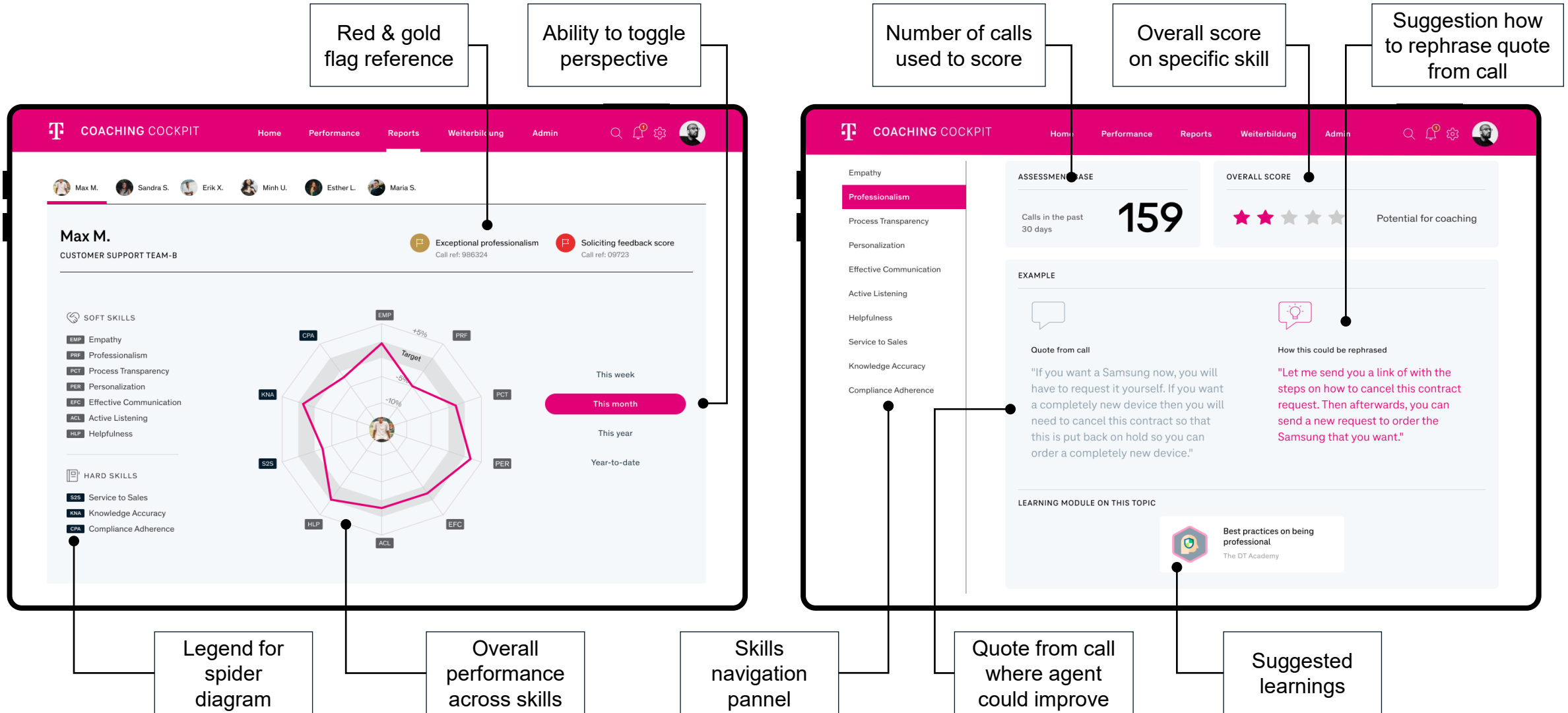
Rephrase opportunity:

“I can help you on how to lookup the order status yourself if you want, or can also just provide you with the status”

1. Although example of low professionalism within the call, score balanced out by professionalism in the rest of the call

The output of those assessments is mapped to overall agent score and then leads to personalized coaching and training suggestions

Mockup co-created with Team Leads



Learnings identified during this GenAI proof of concept



Do's

- Use a **combination of different prompts**, as well as ask for explanation/justification in the prompt. This helps to sense check outcome and avoid 'hallucination'.
- Add **narrative on setting, quality and language** to increase scoring accuracy ("system prompt")
- Prompt the model in the **native language**, as this can improve the quality of the output (~10pp in our PoC)
- Perform multiple **iterations on the description** of the prompt, because of high sensitivity to phrasing
- Data quality will impact output, hence think about options to **improve data quality** (GenAI could also help here)



Don'ts

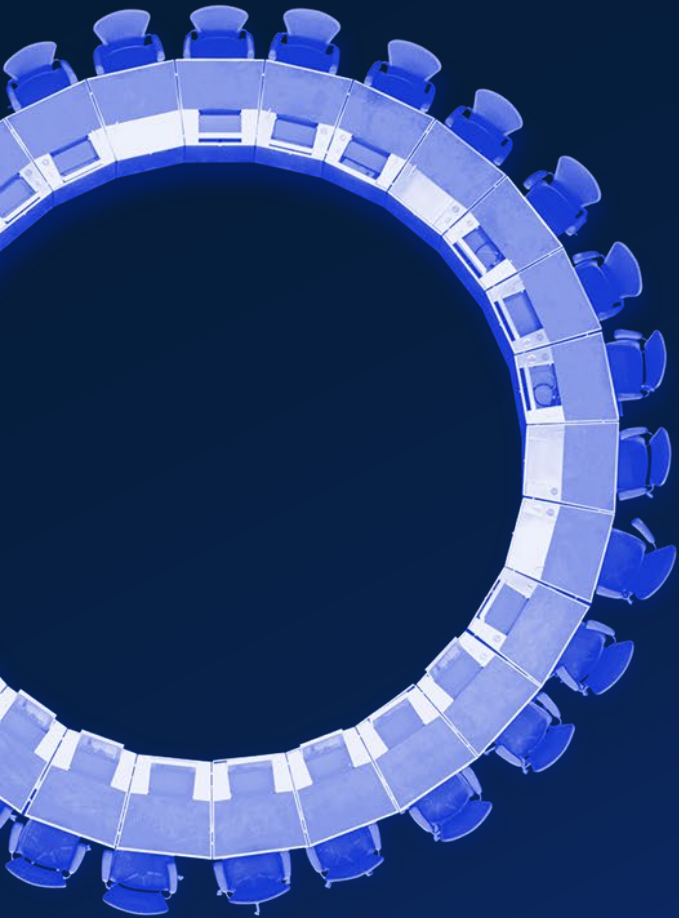
- Running only a small number of examples, as **one-shot in-context learning** may lead to overfitting
- Using very **detailed and long descriptions**, as they will be less effective than concise definitions
- Asking assessment questions based on **summaries**, as the lack of details decreases accuracy
- **Biasing the LLM** because of the fact it is a machine, as some outcomes can beat human understanding



Key takeaways

- Split tasks into **separate requests** to better accuracy than single request/prompt
- Try many **different and concise prompt variations** when fine-tuning, to challenge language sensitivity
- Implement **hard checks** to rule out hallucinations and false quotes (don't blindly trust the engine)

Today's agenda



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Deutsche Telekom - case example

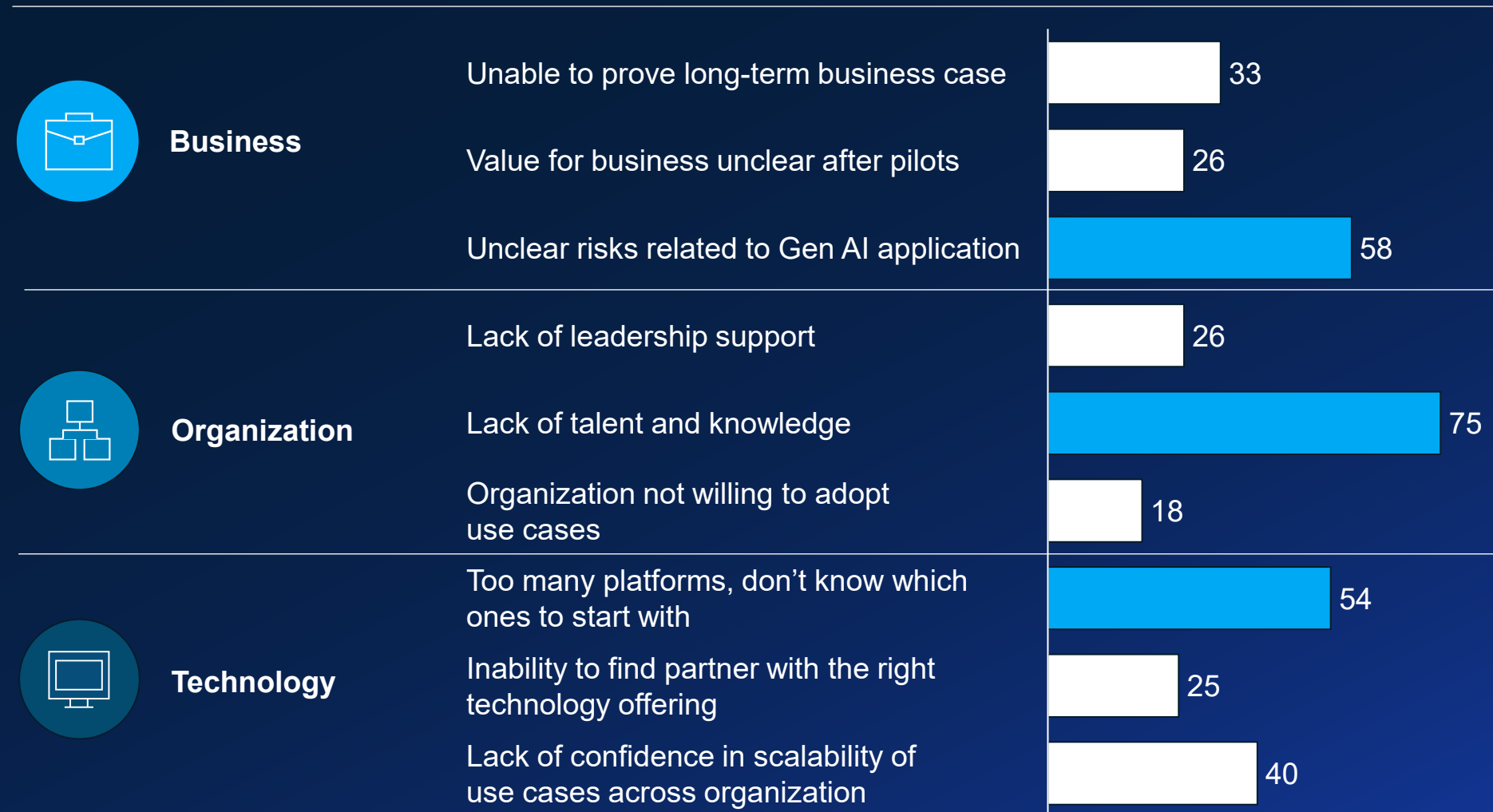
4



How to get started?

Q2: What are the top 3 obstacles keeping you from getting started to implement Generative AI use cases at scale?

Domain



Organizations are worried about application risks, talent and knowledge acquisition and technology selection

They are likely to seek guidance on right ways to embark on Gen AI journey






Graph does not include responses from internal participants

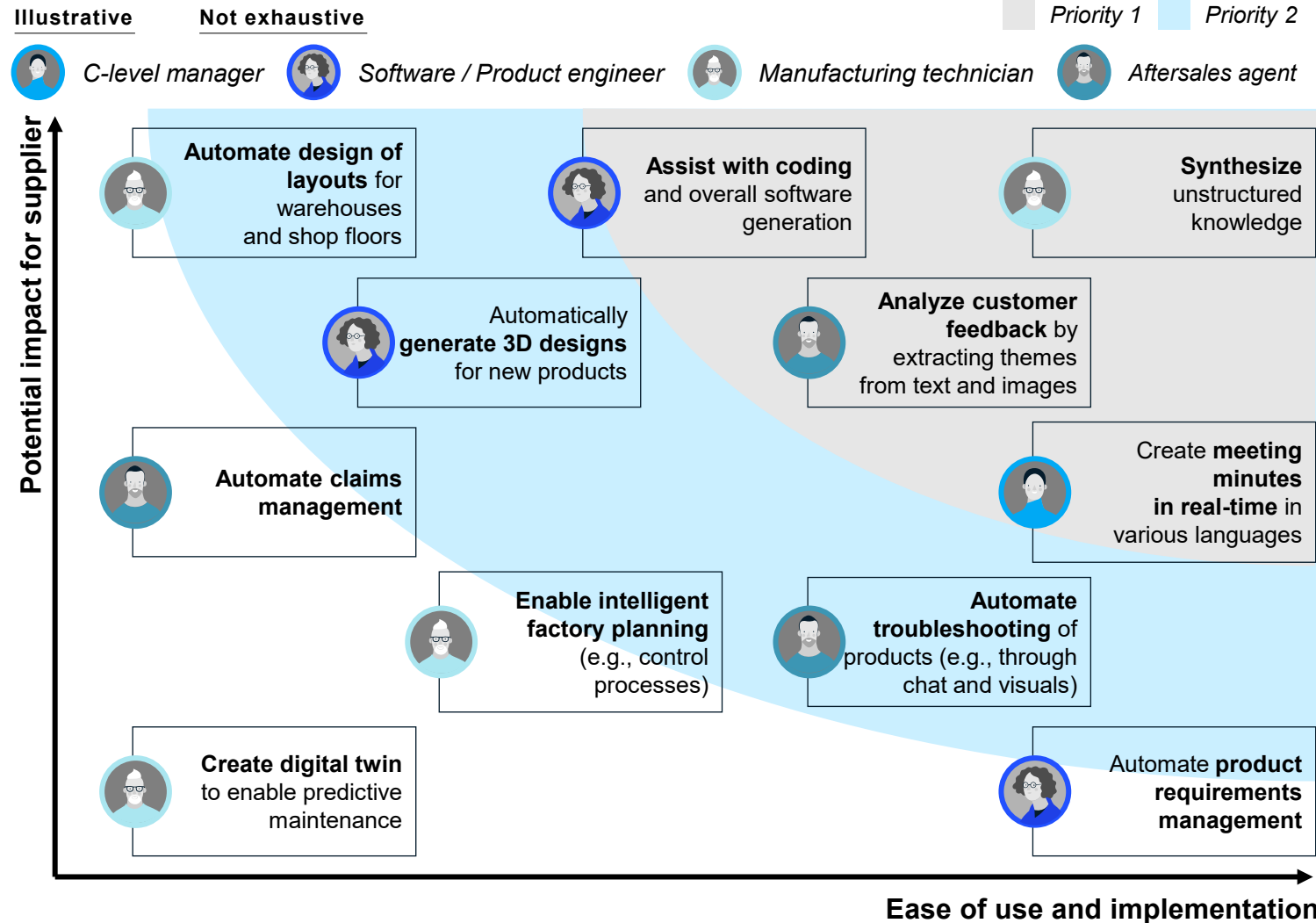
Source: Generative AI, a boost for operations webinar report

6 actions can mitigate pitfalls in digital transformations, also with generative AI



Transformation areas		Key Actions	Pitfalls	Winners
Business 	Deliver a combination of digital use cases and traditional levers across the end-to-end value chain	<ol style="list-style-type: none"> 1 Use case definition & implementation 2 Rollout plan and enablement 	<i>"Just another IT project"</i>	<i>"Business-led with ROI payback mindset"</i>
Organization 	Drive the digital journey with a step change in operating model, culture, and capabilities	<ol style="list-style-type: none"> 3 Value Capture 4 Way of working & capabilities 	<i>"Focus on IT and ignore people"</i>	<i>"Redesign processes and reskilling the organization"</i>
Technology 	Evolve IT infrastructure into an architecture that allows for scaling of digital use cases with an ecosystem of partners	<ol style="list-style-type: none"> 5 Platform core development 6 Ecosystem building 	<i>"Pilot trap"</i>	<i>"Scalable IoT architecture and ecosystem of partners"</i>

Organizations should prioritize rigorously, get started on lighthouse cases quickly, and set bold ambitions



Where to start?

- Maximize value from use cases
- Minimize tech complexity
- Minimize risk exposure
- Maximize lessons learned

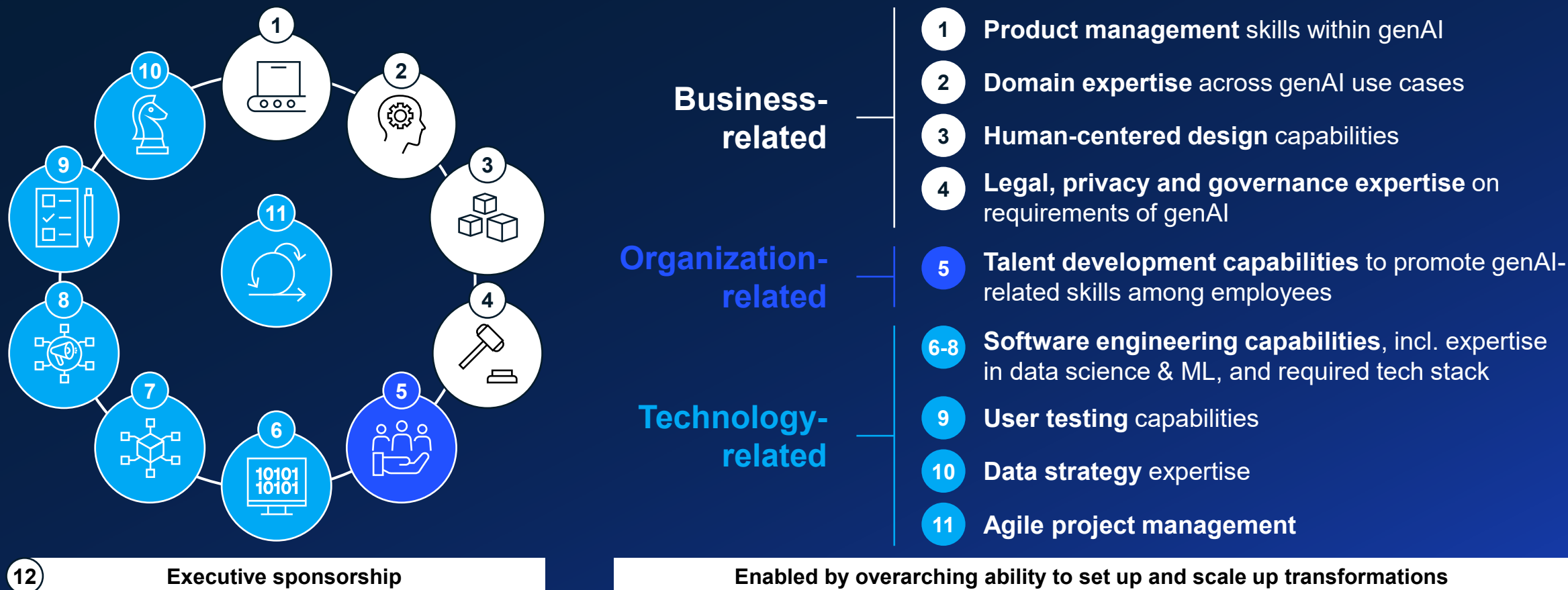
What to aim for?

- Pursue heavy automation of manual tasks
- Fully embrace software / coding use cases
- Invest in R&D to develop differentiating capabilities

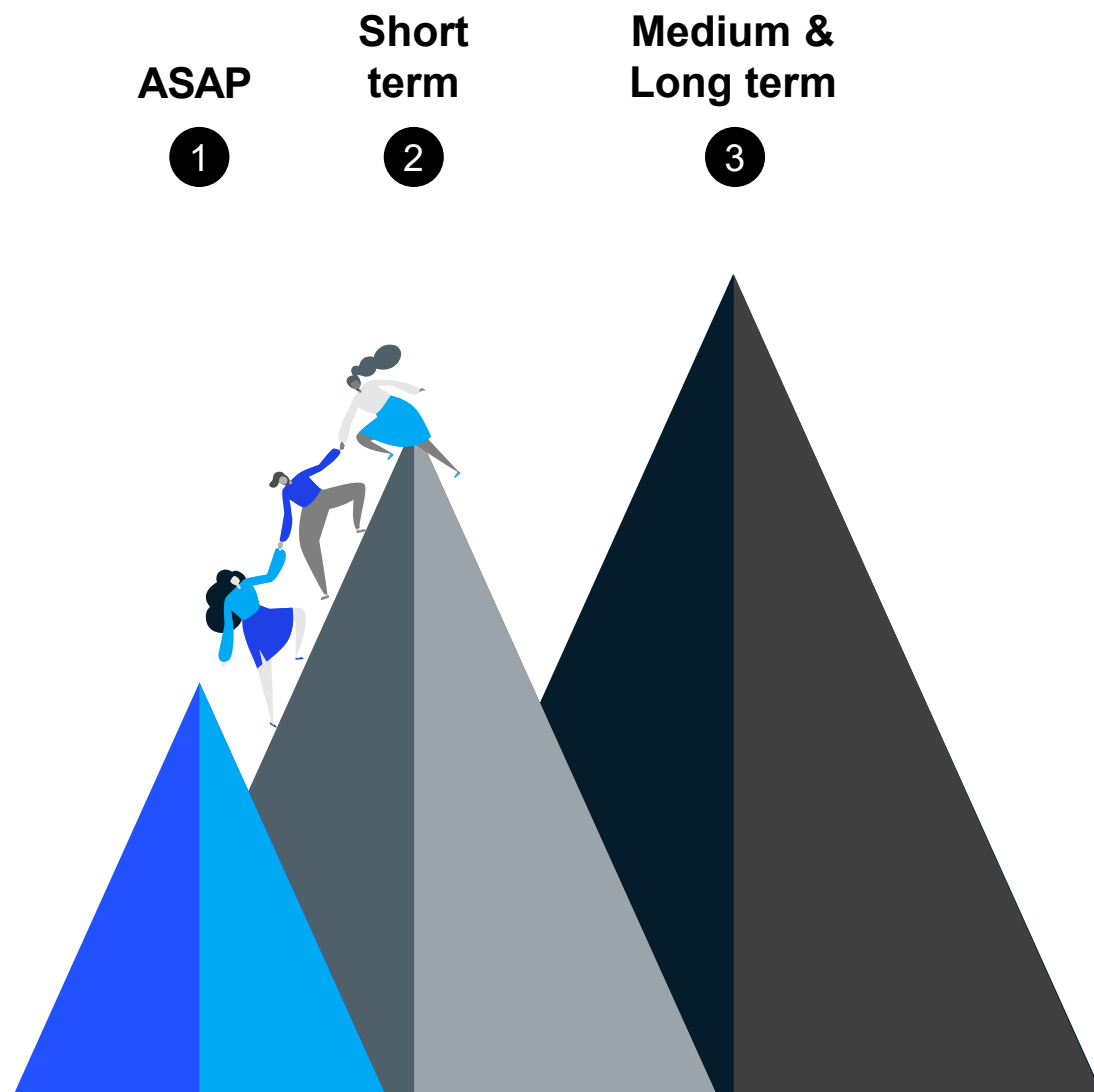
Successful adoption of genAI in production requires widespread capabilities and collaboration across functions

Illustrative

Who needs to be involved and what capabilities to develop?



How to get started on genAI as per tomorrow



- 1 ASAP**

 - **Select a single** (or limited number) "lighthouse" use case with high impact and feasibility
 - Deploy **small cross-functional team** for delivery
 - **Build on openly available 3rd party FM¹** personalizing it with your proprietary data

- 2 Short term**

 - Start a **Proof of Concept**
 - Identify **long-list of use cases** where genAI is suitable
 - **Create business cases** and backlog

- 3a Medium term**

 - Establish **risk & legal framework**, esp. measures for data quality, testing, guard rails, human feedback
 - Develop a **roadmap for building & refining capabilities** (tech, data and people)
 - Build a **scalable, automated, and continuous development environment**
 - Deploy **additional use cases** in MVP versions

- 3b Long term**

 - Build **capabilities**
 - Run **internal and external change management** programs to educate users
 - **Expand use of genAI** across the organization

1. Foundational Model