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Boosting Resilience with Production as a Service

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Four key insights from our study

1. Resilience, value proposition & sustainability are major challenges for manufacturers

2. Production as a Service (PaaS) offers solution and is a huge opportunity for investment & value creation

3. Companies in low-cost countries are more open towards PaaS than high-cost countries

4. Technical issues, sharing and IP are the main challenges in implementing PaaS

About the survey: We launched a global survey in February 2022 with 1,513 participants to evaluate the applicability of Production as a Service

Countries

America

US, Canada, Mexico, Brazil

Europe

Germany, France, UK, Austria, Poland, Italy, Spain

Asia

China, Japan, India, South Korea

15 countries globally; ~100 completed surveys per country

Industries

- Materials
- Capital goods
- Automotive
- Consumer goods
- Health care
- Information technology
- Energy

Broad array of producing industries reflected in survey

Profile

- ✓ Management level
- ✓ Production or finance role
- ✓ >250 employees in company
- ✓ Own production
- ✓ >10Mio revenue

Management level of producing companies targeted

Survey results at a glance – I/II

1 Resilience, value proposition & sustainability are major challenges for manufacturers

- 43% of survey respondents plan to regionalize (parts of) their production
- 44% said that supply chain risks are among their top three concerns
- 45% said that cost pressure is among their top three concerns
- 27% will not reach their targeted utilization in the next three years
- 40% plan to outsource some or all of their production and 41% plan to insource some or all production
  - High-cost countries such as Germany, France, Austria, US tend towards net insourcing
  - Emerging economies or countries that used to have cheap labor, such as China, Poland and India, tend towards net outsourcing; their main motivator being to reduce operating costs

2 Production as a Service offers solution and is a huge opportunity for investment & value creation

- "as-a-Service" (aaS) models decouple utilization from ownership of machinery, reducing financial risks for the user of machinery & equipment
- 43% of global machinery and equipment producers that do not have an aaS offering yet plan to offer aaS models for their equipment going forward
- Many aaS models for single equipment exist already on the market, e.g., for laser cutting machines, printing machines, machining centers or turbines
- aaS models can also be scaled to the size of an entire factory, which is called "Production as a Service" (PaaS)
- PaaS comprises of three building blocks: flexible production, financial transformation and sharing
- Generally, asset-heavy industries that rely on high utilization are more suitable for PaaS models
- PaaS is a huge opportunity for investment and value creation
  - $72-98B potential annual investments in machinery and equipment could be realized in PaaS setups. Thereof, $22-26B in China, $22-26B in the US, $5-7B in Germany. Germany yields the third-biggest potential
  - $722-898B potential annual manufacturing value added could be realized in PaaS setups. Thereof, $220-260B in China, $190-230B in the US

Note: Survey participants global n = 1,513; Germany n = 111

Survey results at a glance – II/II

3 Companies in LCCs more open towards PaaS than HCCs

- 77% of global respondents said they will **focus on greater flexibility** rather than greater physical efficiency despite higher investment costs
  - In Germany, this share is at 81%, indicating that **German companies see flexibility even more important** than the global average
- 85% of global respondents said they **can imagine sharing their production** within their corporate group or externally if they build it from scratch
  - In Germany, this share is at 68%, indicating that **German companies are more hesitant** in sharing factories
- 23% of global respondents say they will **consider new financing concepts**, such as external investors funding and owning production assets
  - In **Germany**, this share is at 18%, indicating they are more conservative and **"owning" equipment seems important** for them
  - Out of the global respondents that will **consider new financing concepts**, 33% of participants are willing to pay a premium of 10% or higher for an externally funded production which gives them more financial flexibility

4 Technical issues, sharing and IP main challenges

- 52% of global respondents pointed to **technical issues** as one of the most critical challenges in implementing PaaS
- 45% said that **finding the right users to share** production is among the biggest challenges to implementing PaaS.
- 40% cited **IP protection** as a major PaaS challenge

Note: Survey participants global n = 1,513; Germany n = 111

Key challenges for manufacturers today

44% said that supply chain risks are among their top concerns

High-cost countries tend towards **net insourcing**

43% of companies plan to regionalize production

Resilience

Reshoring & regionalization to address supply chain uncertainties

79% have set net-zero ambition until 2050[1]

CO_2-intense global supply chains make it **difficult to reach targets**

Producers **regionalize operations** to improve sustainability

Sustainability

Ambitious targets across all dimensions of sustainability

1. BCG study "Factory of the Future" 2021

>7% inflation in EU in Mar '22 (all-time high)

45% said that cost pressure is among their top 3 concerns

27% of companies will fall below target utilization

Value proposition

High-cost pressure on manufacturing and supply chain

Resilience

Reshoring to high-cost countries requires **high investments** through higher automation

Bicycle frame manufacturing in Asia

vs.

Bicycle frame manufacturing in EU

Sustainability

Decarbonization results in **investment risks** through new technology

CO for steel making

vs.

H_2 for steel making

Value proposition

Regionalization results in **scale challenges** and **utilization risks**

Large, global factory

vs.

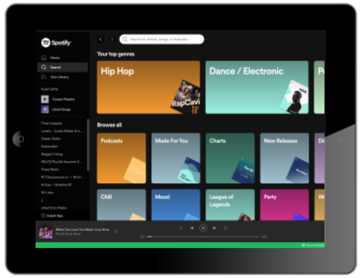
Small, local factory

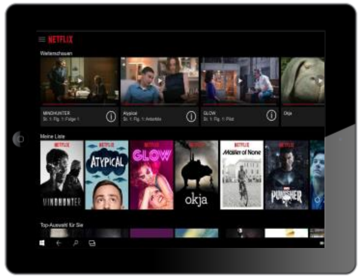
Owning factories and equipment becomes a challenge for manufacturers

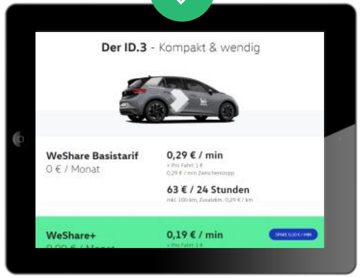
Manufacturers can remove the burden of ownership using subscription models as already omnipresent in other industries

Before
(ownership)

Today
(subscription)







Production as a Service

A highly **flexible factory**, owned by **external investors** and **shared** by multiple users

Key elements of Production as a Service

Flexible production — Factory produces **multiple products efficiently** and can adapt to **volume changes quickly**

+

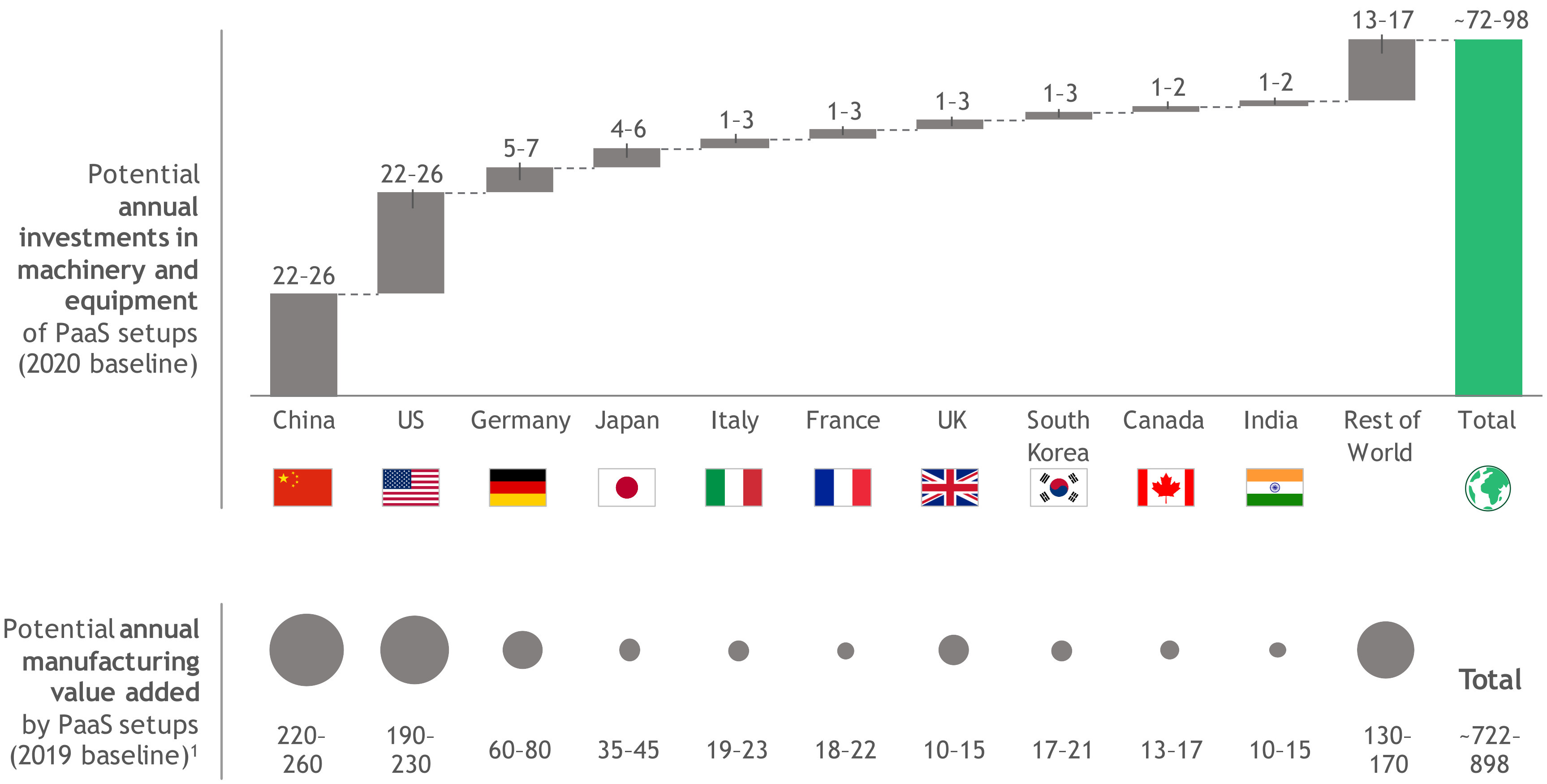
Sharing — Multiple users share infrastructure on "**pay-per-use**" basis, **variabilizing their fixed costs**

+

Financial transformation — **Smart structuring** enables **third parties** to share operational risks and provide **funding**

PaaS is a huge opportunity for investment and value creation

Potential annual market size for PaaS ($billions)



PaaS applicability

High asset intensity
(because dedicated financing requires minimum invest threshold to justify related expenses, such as fees for structuring/legal fees)

Low volumes
(producers that cannot fully utilize their equipment)

Efficient change-overs
(it must be possible to accommodate efficient changeovers)

1 "Manufacturing value added" refers to the net output of manufacturing industries (total outputs minus intermediate inputs).

German survey participants are more conservative regarding sharing and new financing concepts than global average

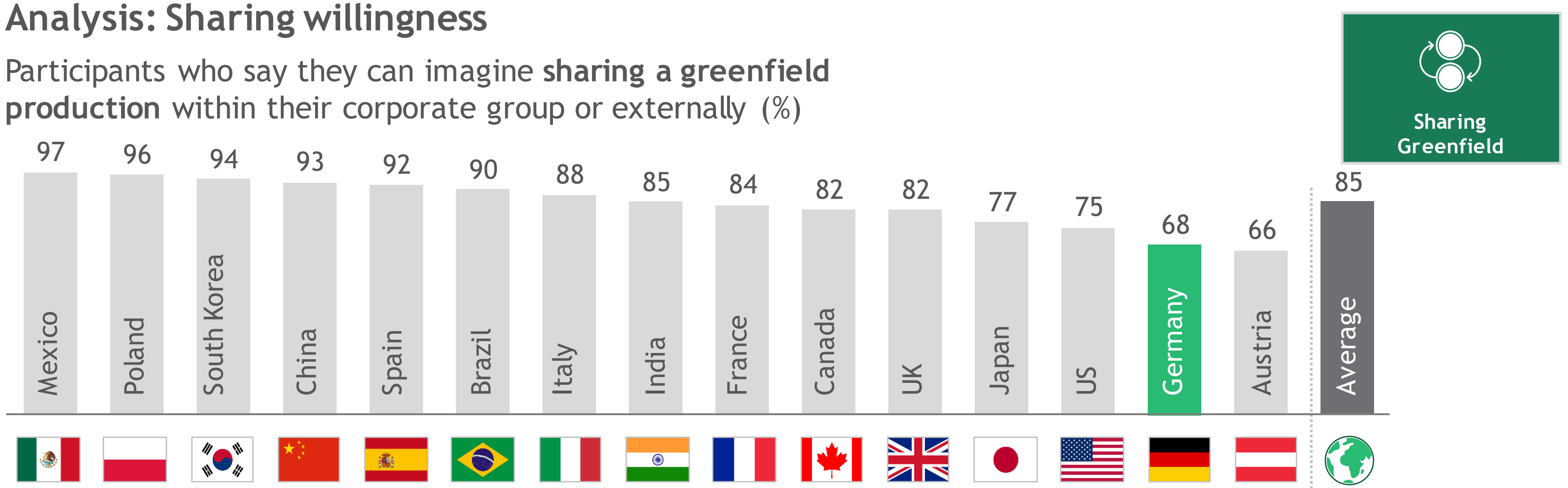
PaaS elements	Survey results	Global average (n = 1,513)	Germany (n = 111)	
Flexible production	Respondents who say they will focus on **greater flexibility rather than greater physical efficiency**, despite higher investment costs (%)	77	81	
Sharing Greenfield	Respondents who say they can imagine **sharing a greenfield production** within their corporate group or externally (%)	85	68	Deep dive
Sharing Brownfield	Respondents who say they can imagine **sharing a brownfield production** within their corporate group or externally (%)	62	60	
Financial transformation	Respondents who say they will consider **new financing concepts**, such as external investors funding and owning production assets (%)	23	18	Deep dive

Note: HCC – High-cost country, LCC – Low-cost country, PaaS – Production as a Service

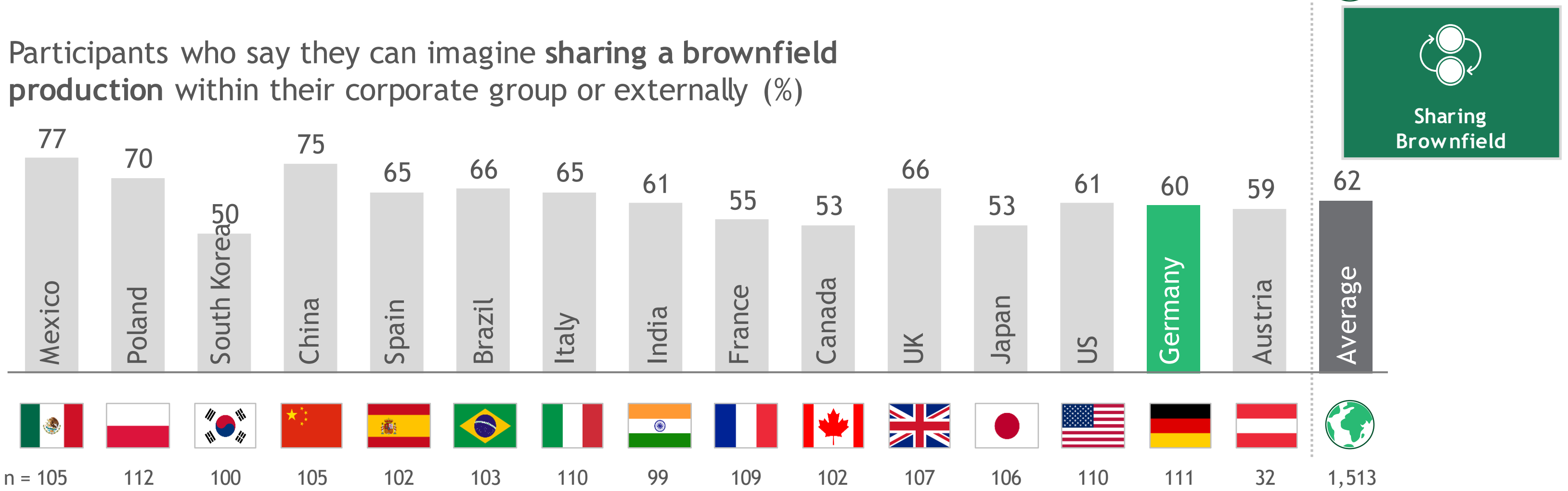
Deep dive – Sharing: Companies in low-cost countries tend to be more open towards sharing than high-cost countries

Analysis: Sharing willingness

Participants who say they can imagine **sharing a greenfield production** within their corporate group or externally (%)



Participants who say they can imagine **sharing a brownfield production** within their corporate group or externally (%)



Key take aways

68% of respondents in Germany are open to sharing their production internally or externally

Companies in high-cost countries are less open to sharing, reflecting their **IP concerns**

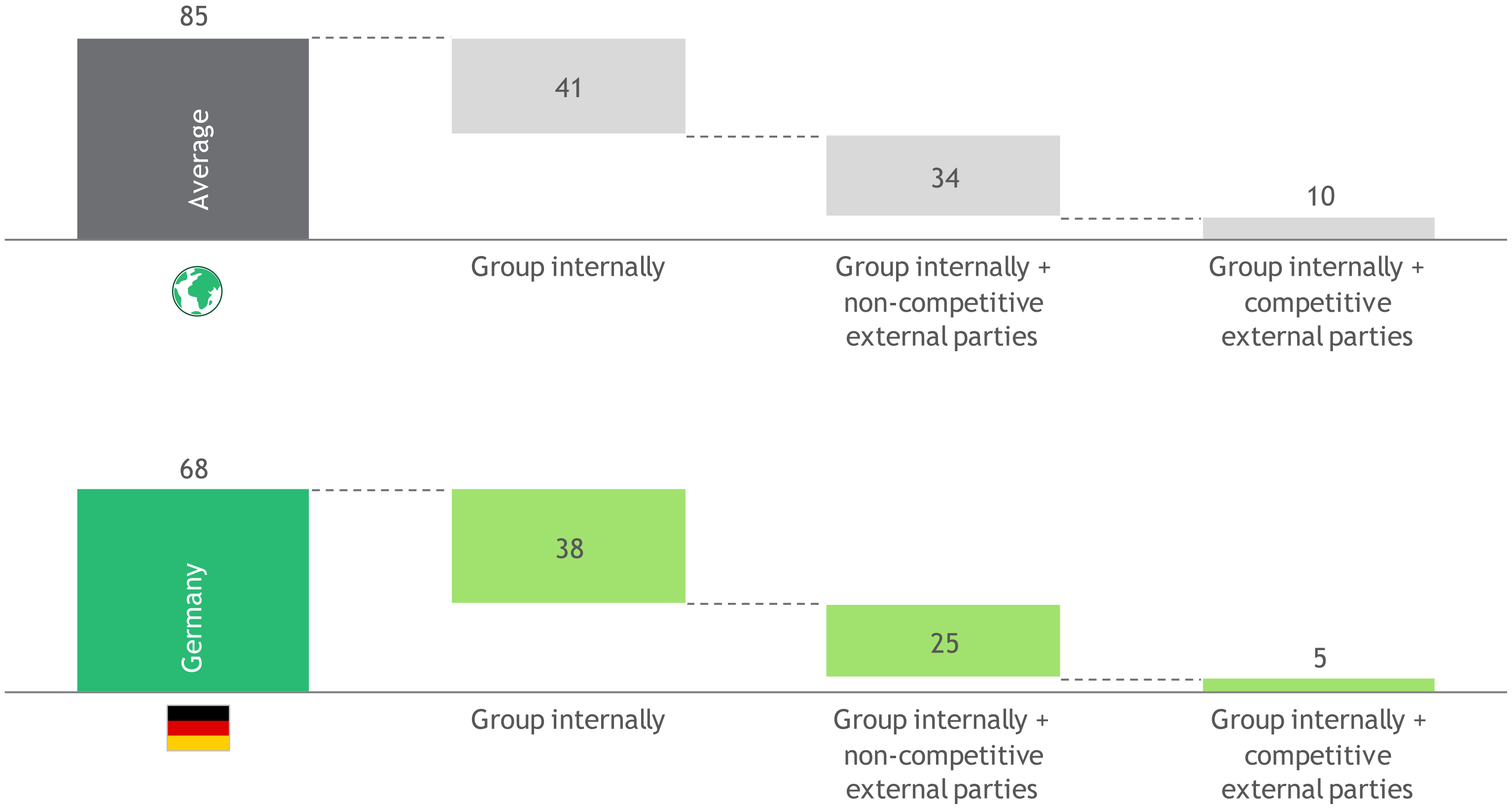
Source: 2022 Factory of the Future survey

Deep dive – Sharing: 10% of global companies would share their production with competitive external parties

Analysis: Sharing willingness by sharing partner

Participants who say they can imagine **sharing a greenfield production** within their corporate group or externally (%)

Sharing Greenfield



Key take aways

10% of all respondents are open to sharing factories even to competitive external parties

In Germany, only **5%** are open to sharing factories to competitive external parties

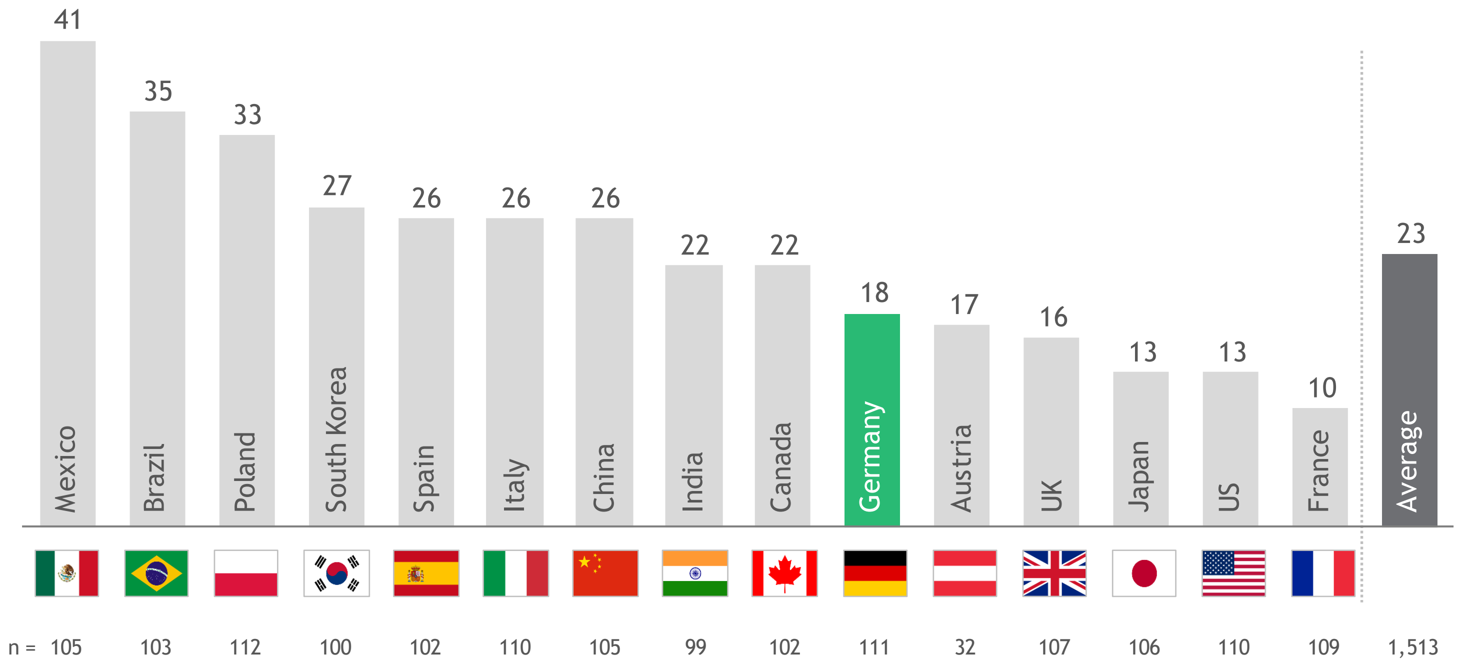
A possible explanation could be that German companies see their production as **intellectual property** which they want to protect

Deep dive – Financial transformation: High-cost countries prefer conventional ways of funding for their production

Analysis: New financing concepts

Participants who say they will consider new financing concepts, such as external investors funding and owning production assets (%)

Financial transformation



Key take aways

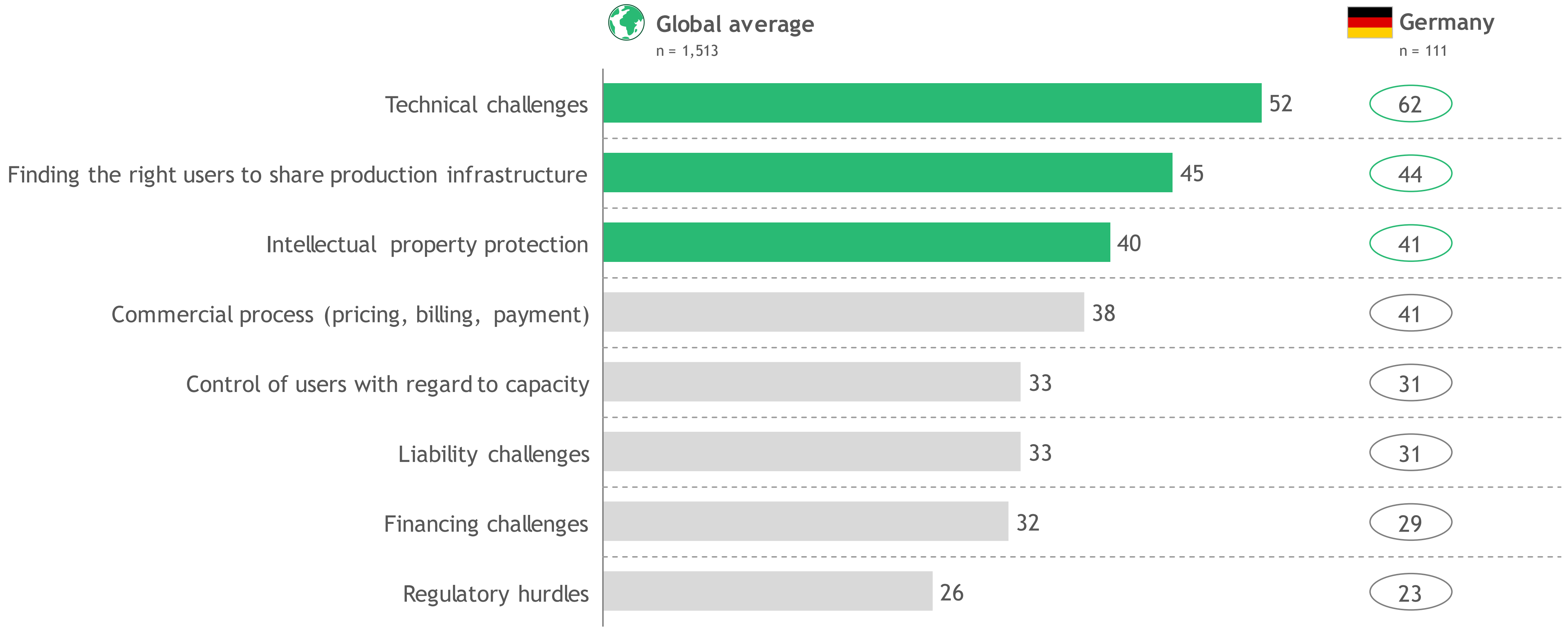
18% of respondents in Germany will consider new financing concepts for their next invest decision

Companies in LCCs may be motivated to adopt new financing structures to **maintain local operations** even as rising wages undermine their competitiveness

Note: HCC – High-cost country, LCC – Low-cost country
Source: 2022 Factory of the Future survey

Companies seeking to implement PaaS face multiple challenges

Participants who rated a challenge as being among the top-three most critical (%)



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