



Quality 4.0 Takes More Than Technology



**4th International Conference on
Quality Engineering and Management**

A better world with Quality!



September 21 - 22, 2020
University of Minho

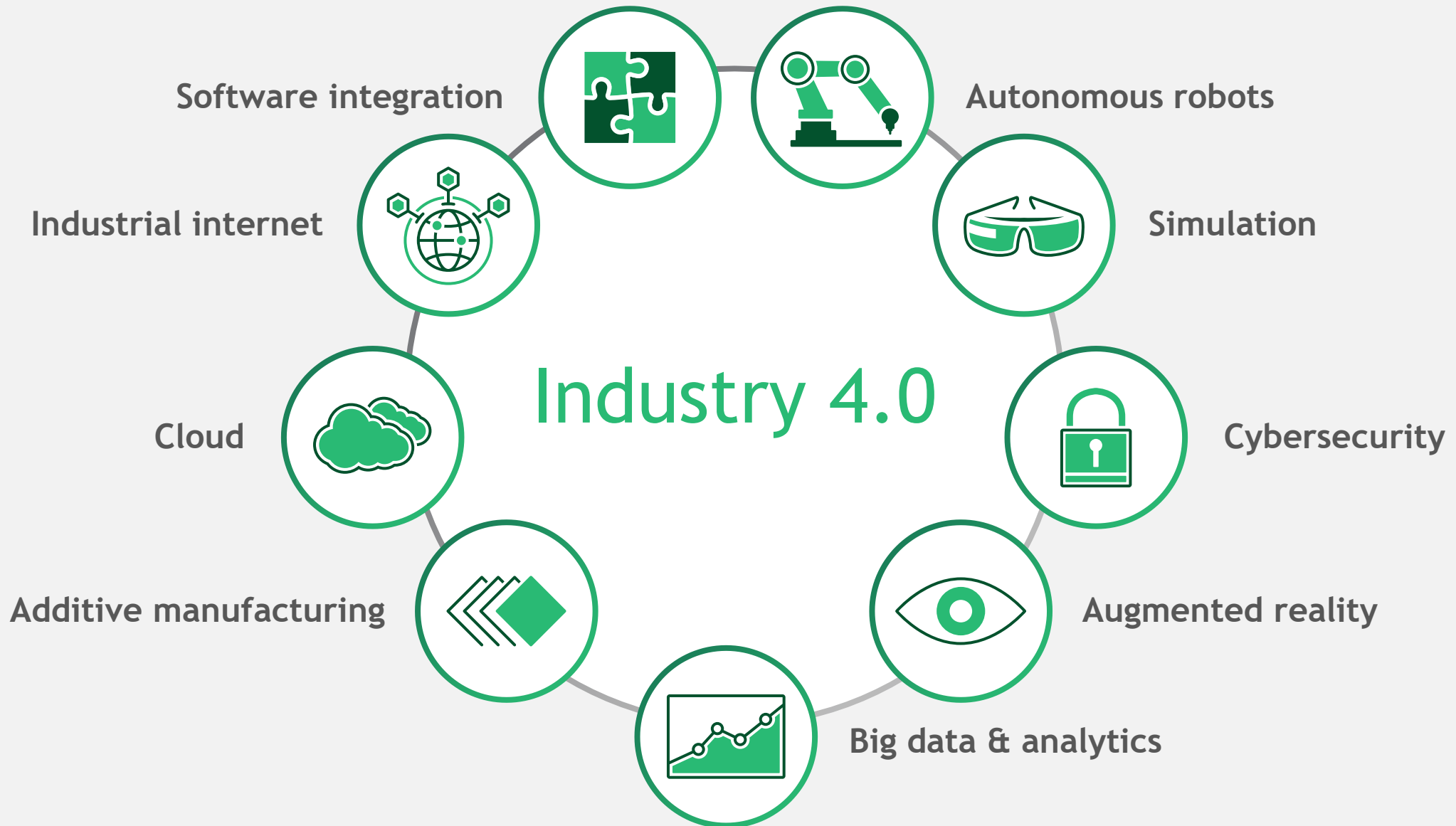
Quality 4.0

Quality 4.0 brings together

- Industry 4.0's advanced digital technologies with
- quality excellence

to drive substantial performance & effectiveness improvements

Digital technologies are impacting future operations

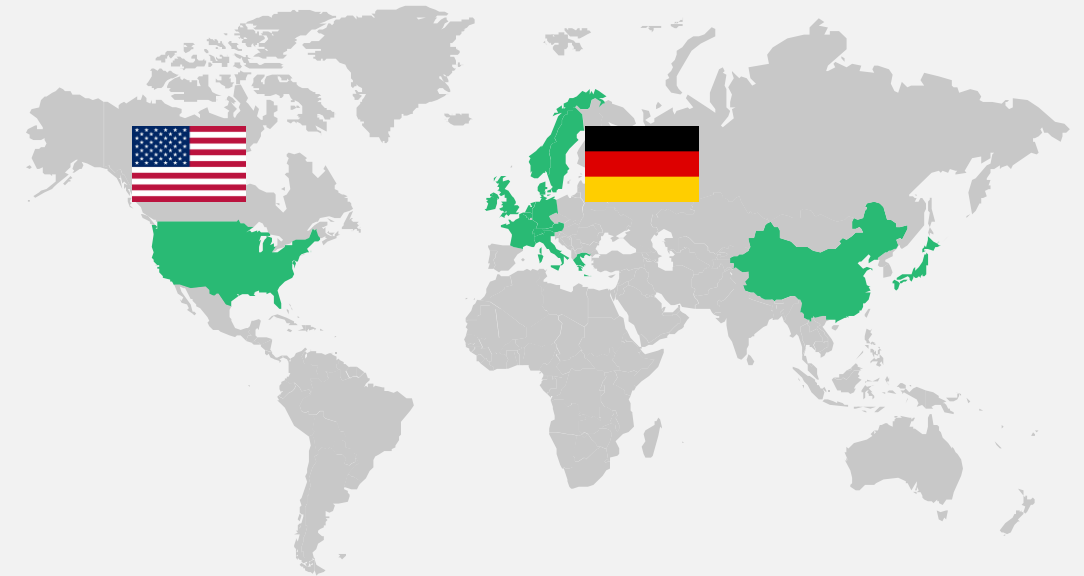


Study with 220+ leaders from producing industries

③ Industry sectors targeted



Focus on US and Germany, but an overall global sampling



1. Also includes Chemicals, Aerospace & Defense, Construction & Infrastructure, Agriculture, Metals & Mining, Plant Engineering, Forest Products, Paper, and Packaging, Rail, Oil & Gas, Shipbuilding, Steel; 2. 1. 18 countries sampled, majority of responses coming from Germany and the United States
Source: Quality 4.0 study by Boston Consulting Group (BCG), American Society for Quality (ASQ), Deutsche Gesellschaft für Qualität (DGQ)

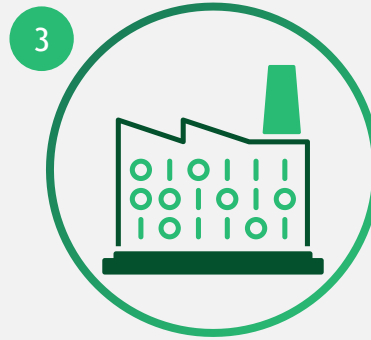
Study highlights 5 key themes



1 Only **16%** have implemented Quality 4.0 initiatives, **63%** have not started planning



2 High impact across metrics e.g. **12-20%** lower quality check costs



3 **47%** and **41%** state digital technology is extremely important for Manufacturing & R&D, respectively



4 Digital skills/talent gap is **#1** challenge but data barriers intensify **+26%** for Frontrunners

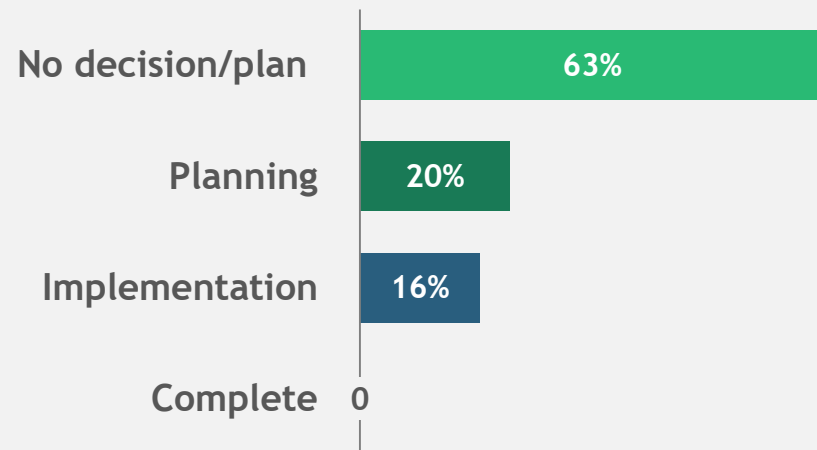


5 Soft skills rank highest but data analytics has largest expertise delta - **69%** plan worker upskilling

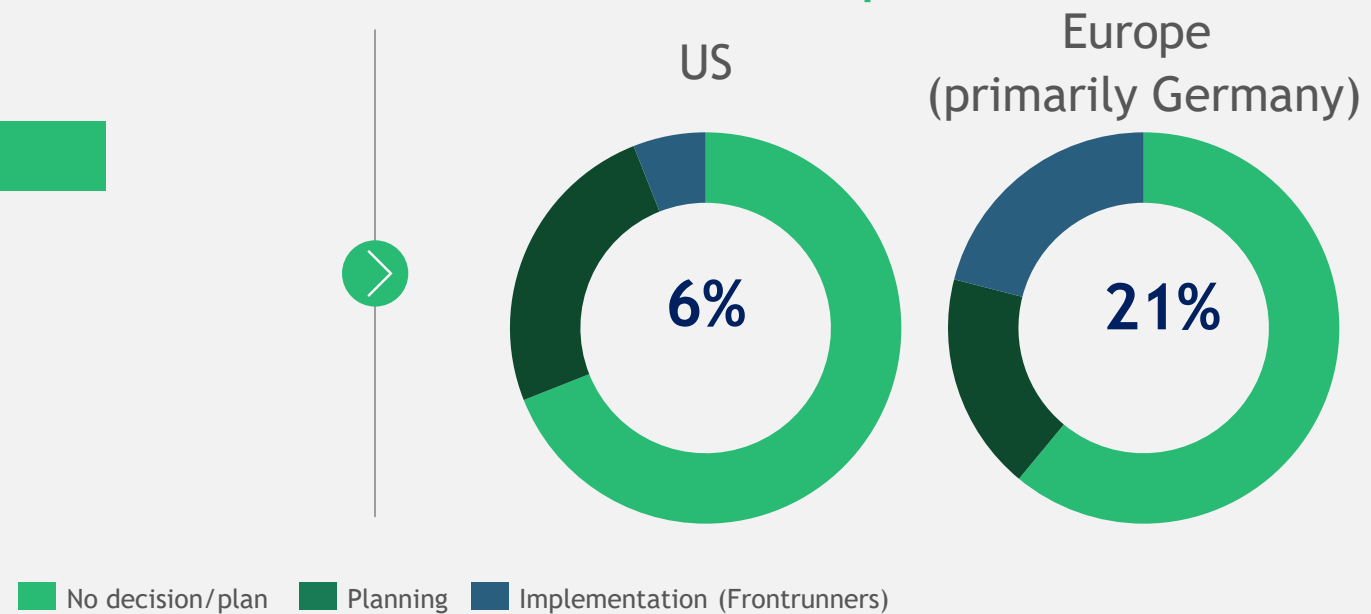


Despite the benefit, 63% of companies have not started

Most companies have not started,
16% are Frontrunners



Sample's Frontrunners are mainly
based in Europe

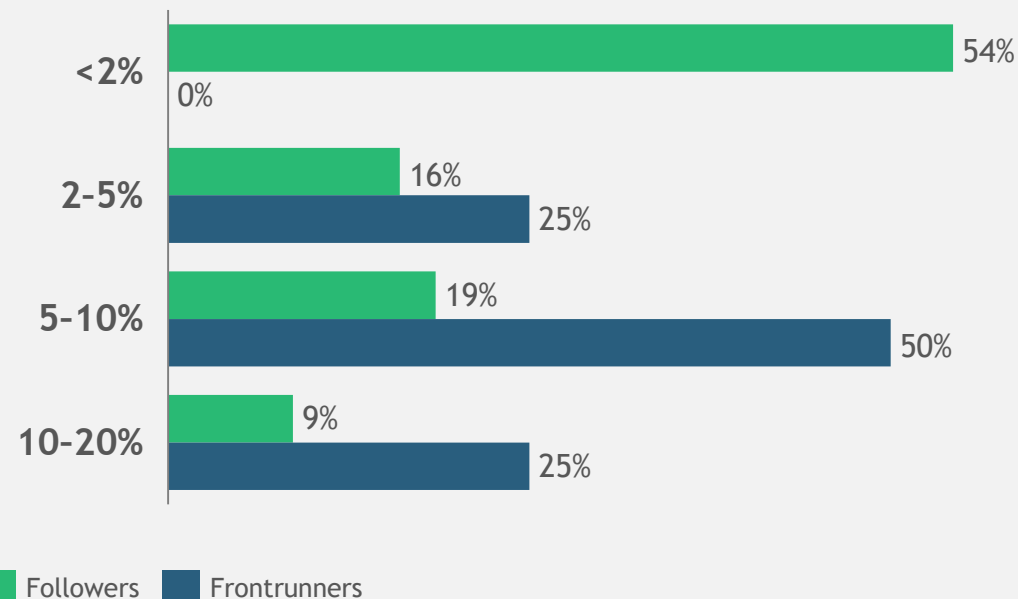




Companies need to invest more for Quality 4.0 success

Frontrunners are expanding their Quality 4.0 resources

% of FTEs dedicated to Quality 4.0 today



Initiative implementation requires Quality investment and engagement

“Often viewed as cost versus investment; do not wait for a catastrophe to move”

“[They] lack full ROI because they didn’t set up well and didn’t fully understand how to utilize the digital quality solutions or who has the maintenance expertise”

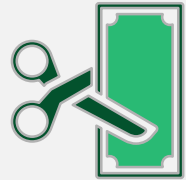
“70% focus on ongoing operations, 20% on continuous improvement, 10% of work is real innovation”

Question: Focusing on your quality management FTEs today, what percentage are dedicated to digital quality/Quality 4.0?

Source: Quality 4.0 study by Boston Consulting Group (BCG), American Society for Quality (ASQ), Deutsche Gesellschaft für Qualität (DGQ)



Quality 4.0 projected to have significant impact



Quality check costs
12-20%
reduction



Defect rate
16-20%
improvement



Warranty claims
10-20%
reduction



Manpower
10-15%
reduction



First pass yield
14-18%
improvement

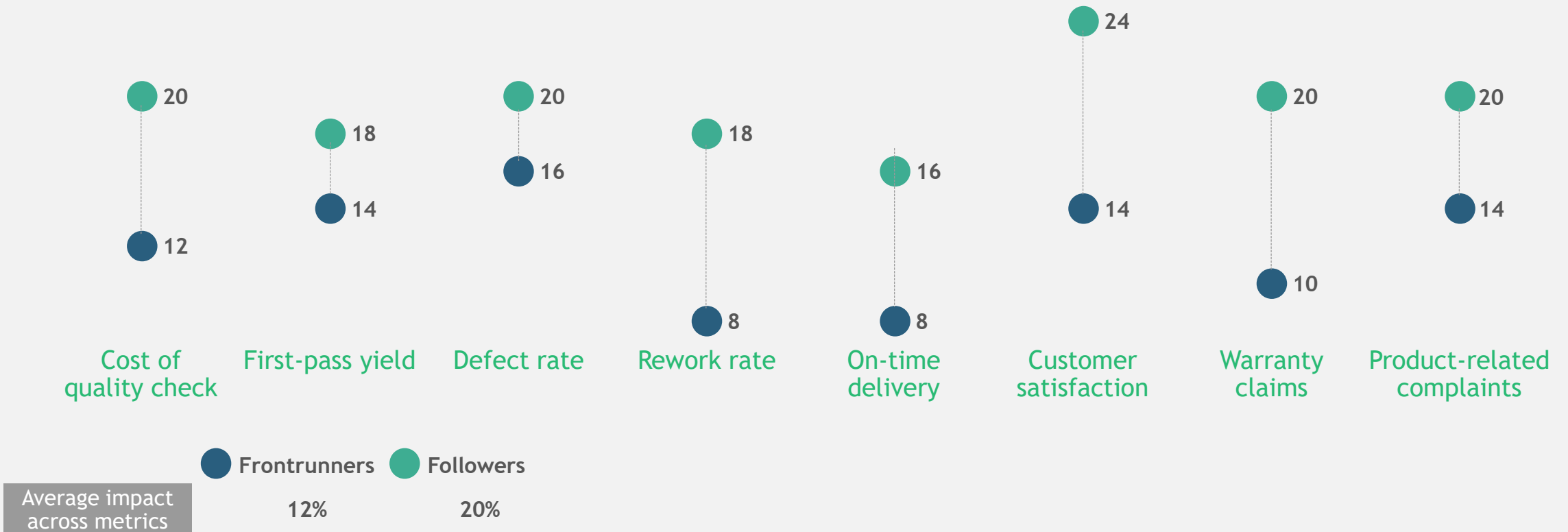


Customer satisfaction
14-24%
improvement



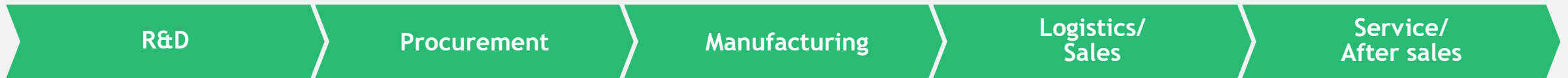
Frontrunners have lower expectations for impact because of implementation challenges

Expected improvement in key metrics (%)



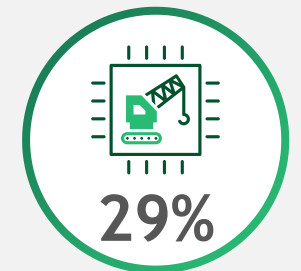
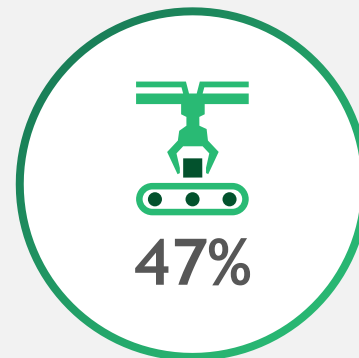
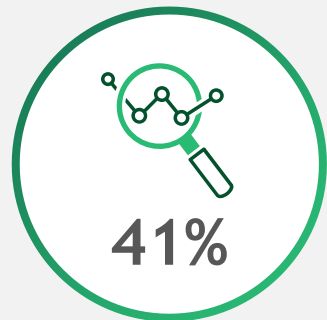


Quality 4.0 has most impact on Manufacturing and R&D



Impact on value chain

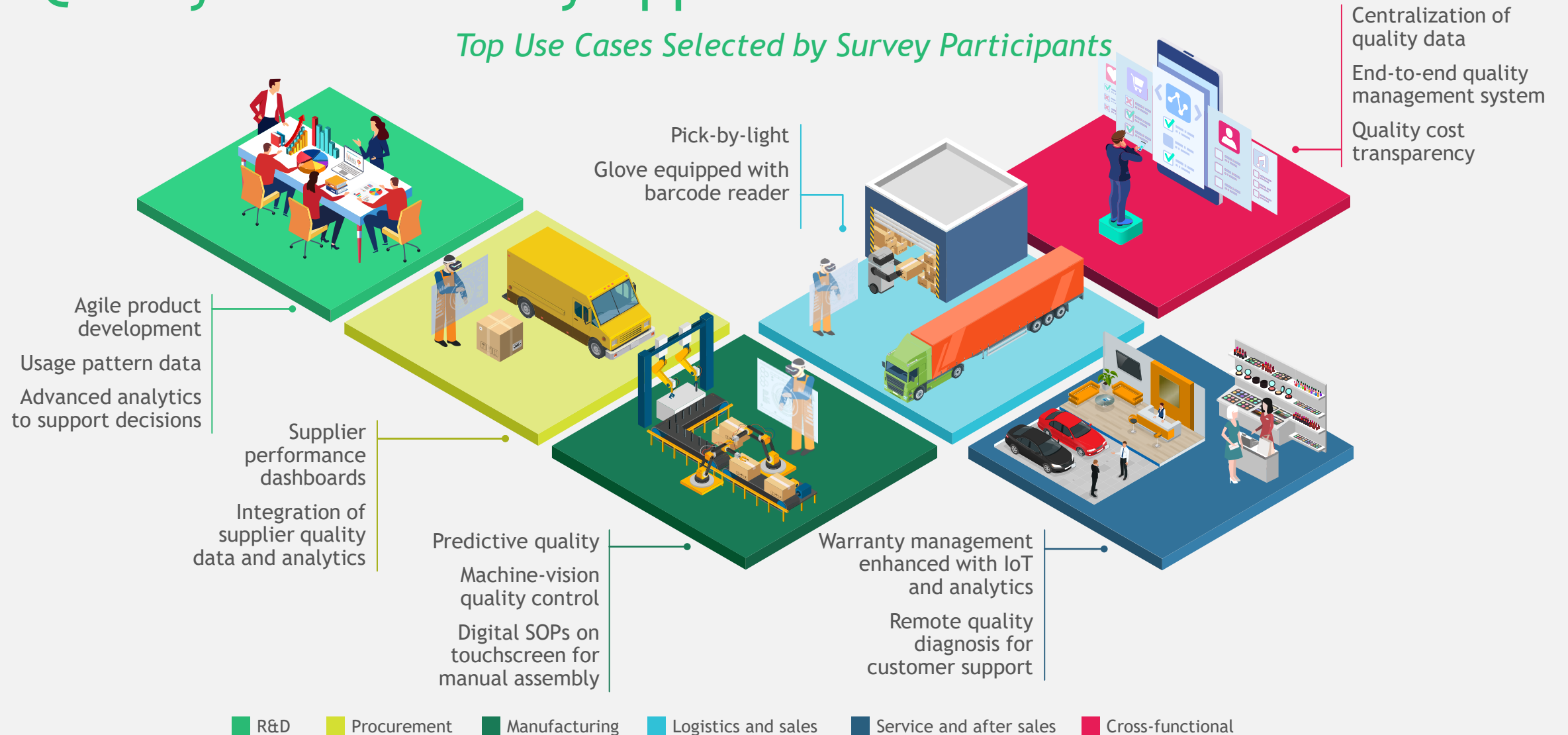
(% of answers ranking digital technologies as extremely important for improving quality in future)





Quality 4.0 Has Many Applications

Top Use Cases Selected by Survey Participants



IoT=internet of things; SOPs=standard operating procedures

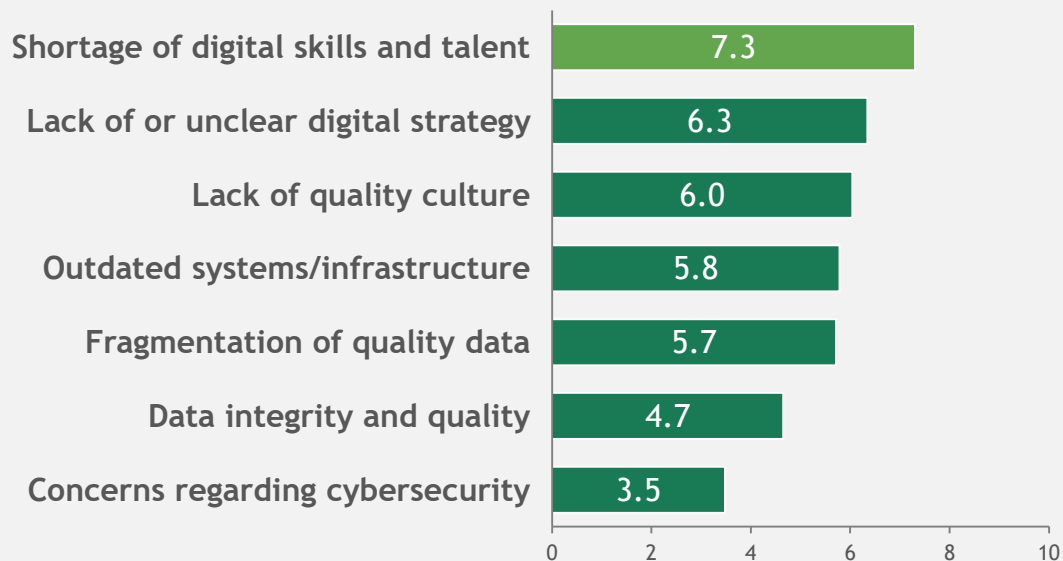
Source: Quality 4.0 study by Boston Consulting Group (BCG), American Society for Quality (ASQ), Deutsche Gesellschaft für Qualität (DGQ)



Shortage of digital skills and talent is greatest challenge

Shortage of digital skills is largest barrier to implementation

Ranking from 1-minor barrier to 10-major barrier



Building digital skills facilitates initiative implementation

"Companies that are winning are investing in people first"

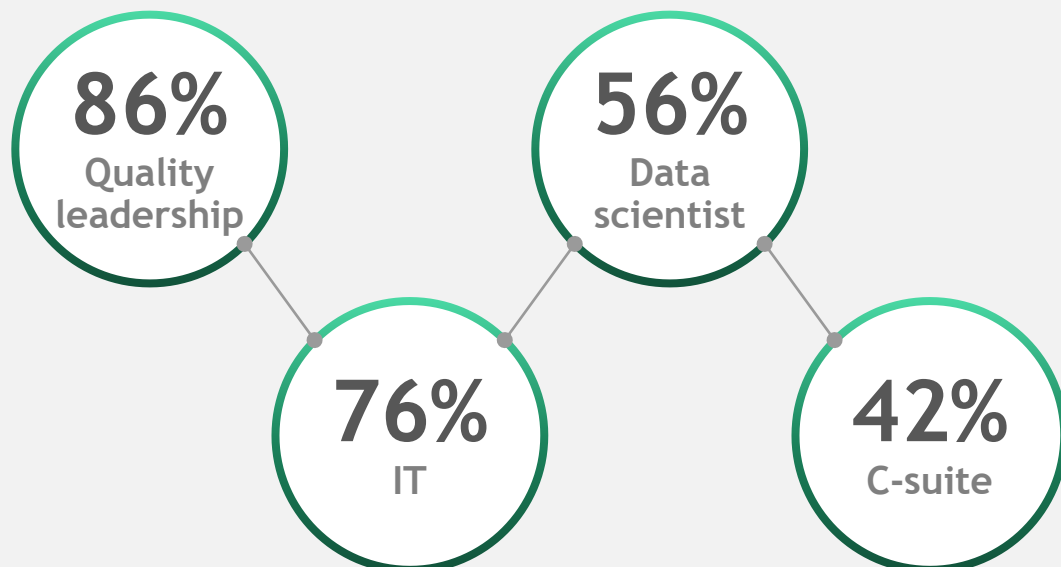
"Quality needs to be a viable career path to attract the right talent"

"Cybersecurity is probably in reality higher, but companies tend to underestimate this."



Cross-functional leadership and critical skill investment enable successful implementation today

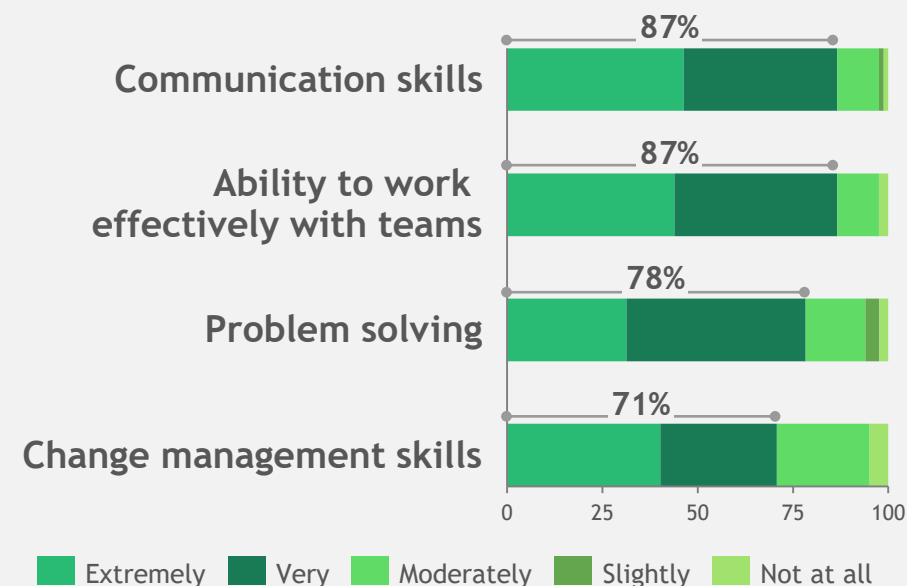
Respondents expect significant impact¹ from:



"Quality needs to be driven cross-functionally, with all functions having 'skin in the game' "

Soft skills seen as most important for Quality 4.0 success today

Importance² for Quality 4.0 success



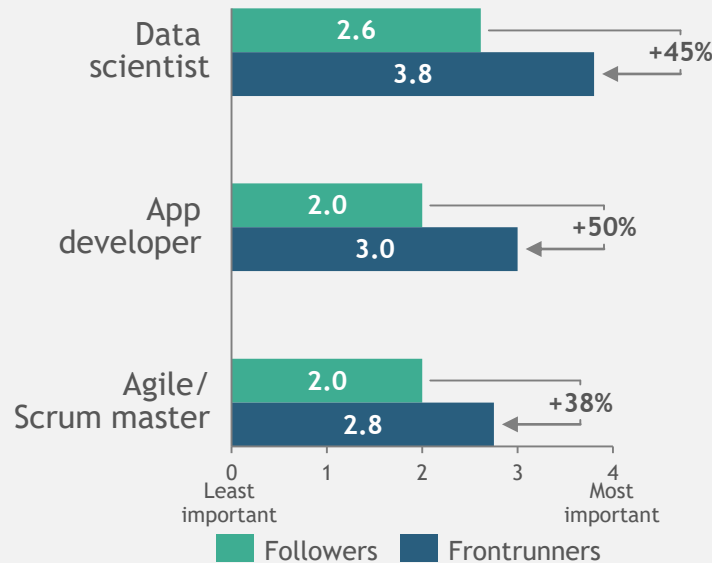
1. % that responded "Very" or "Extremely" important today; 2. % that responded "Very" or "Extremely" important today
Source: Quality 4.0 study by Boston Consulting Group (BCG), American Society for Quality (ASQ), Deutsche Gesellschaft für Qualität (DGQ)



Companies need to develop digital capabilities

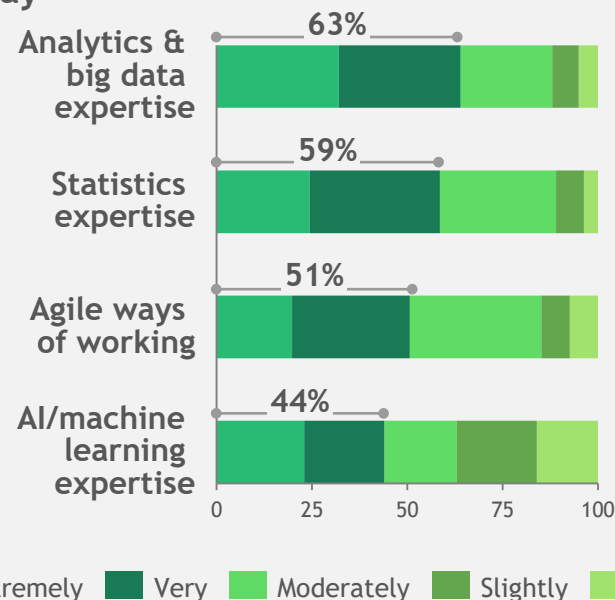
Frontrunners expect higher technical role impact:

Importance¹ for Quality 4.0 success in 5 Years

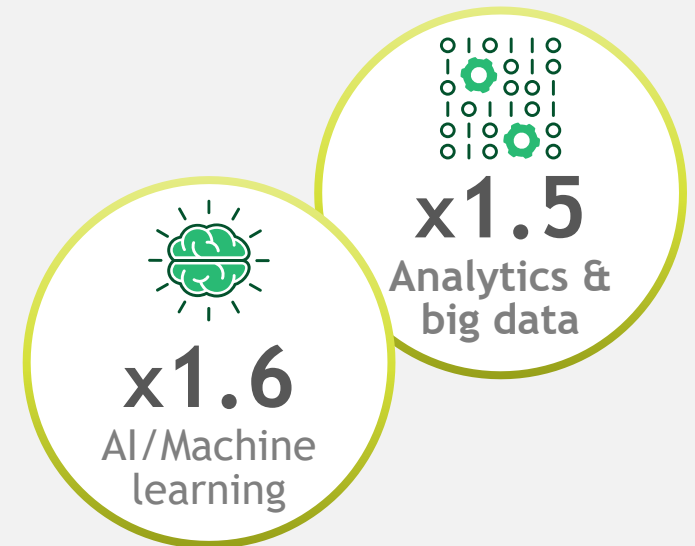


Technical skills enable success today...

Importance² for Quality 4.0 success today



... but need the most development² over 5 years



1. % that responded "Very"/"Extremely" important (5 years); 2. % that responded "Very"/"Extremely" important (today) 3. Scaled difference in proficiency in 5 years and proficiency now
Source: Quality 4.0 study by Boston Consulting Group (BCG), American Society for Quality (ASQ), Deutsche Gesellschaft für Qualität (DGQ)



Upskilling of current employees dominant tactic

69% of companies apply upskilling of current employees as major tactic



Trainings and certifications needed to ensure uplift in required skills

"[3 Fortune 500 companies] certify people in house before bringing technology in."

"You need to train quality professionals in the art of data science."

"You have a lot of quality people that have the skills... it's about the opportunity to use them with the right people at the right time."

Question 120: How do you plan to ensure you have the right talent for Quality 4.0? Please consider any gaps that may exist and allocate a percentage below based on how you plan to use the following tactics to close these gaps. The sum must add up to 100%

Source: Quality 4.0 study by Boston Consulting Group (BCG), American Society for Quality (ASQ), Deutsche Gesellschaft für Qualität (DGQ)

Keys for success with Quality 4.0

- Quality starts at the top - Quality 4.0's contribution to strategy is a visible priority for senior management
- Prepare for the future - leadership must be ready to handle enterprise wide change management
- Everyone owns quality - cross-functional quality ownership and culture; Industry 4.0 initiatives must involve Quality
- Upskill the workforce - expand multipurpose digital skills and comprehensive digital roles
- Build the foundation - develop digital enablers for Quality 4.0 implementation e.g. data architecture
- Technology enables quality - focus on proof of concept use cases that bring value and solve real pain points

Road towards Quality 4.0: Start fast, design for scale



Quality 4.0 team happy to share further insights!



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