2024 DESIGN AND VERIFICATION™ DVCON CONFERENCE AND EXHIBITION TAIWAN

A Comprehensive Data-Driven Functional Verification Process

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SIEMENS

accellera SYSTEMS INITIATIVE

Outline

- Data-Driven Functional Verification is CRUCIAL
- Data Among Functional Verification Process
- Data-Driven Functional Verification Process
- Question and Discussion

Number of spins before production

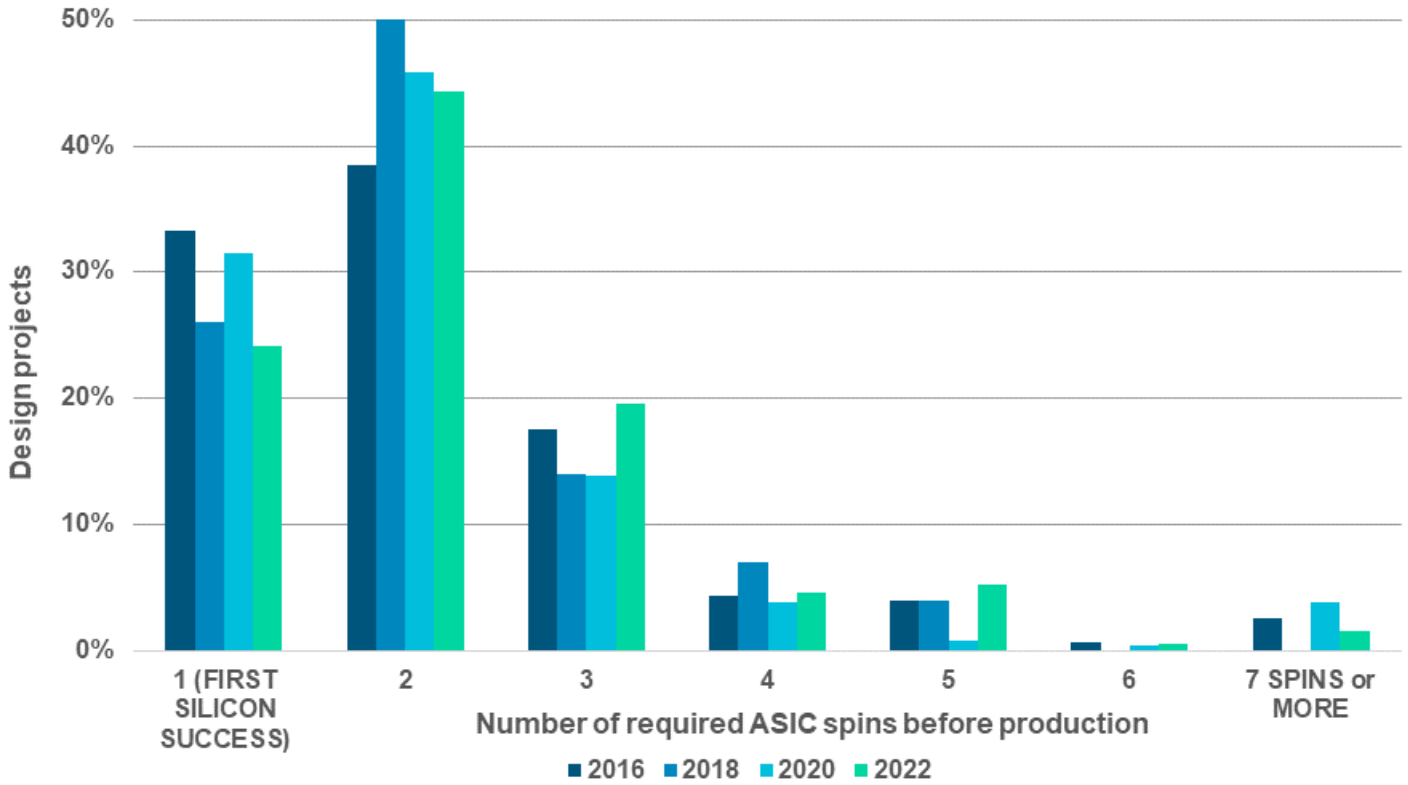
Decline in first silicon success combined with increasing wafer and mask cost

76%

ASICs require 2 or more respins

Wafer costs (vs 28nm):
12nm 1.5X
5nm 5.5X
3nm 10X

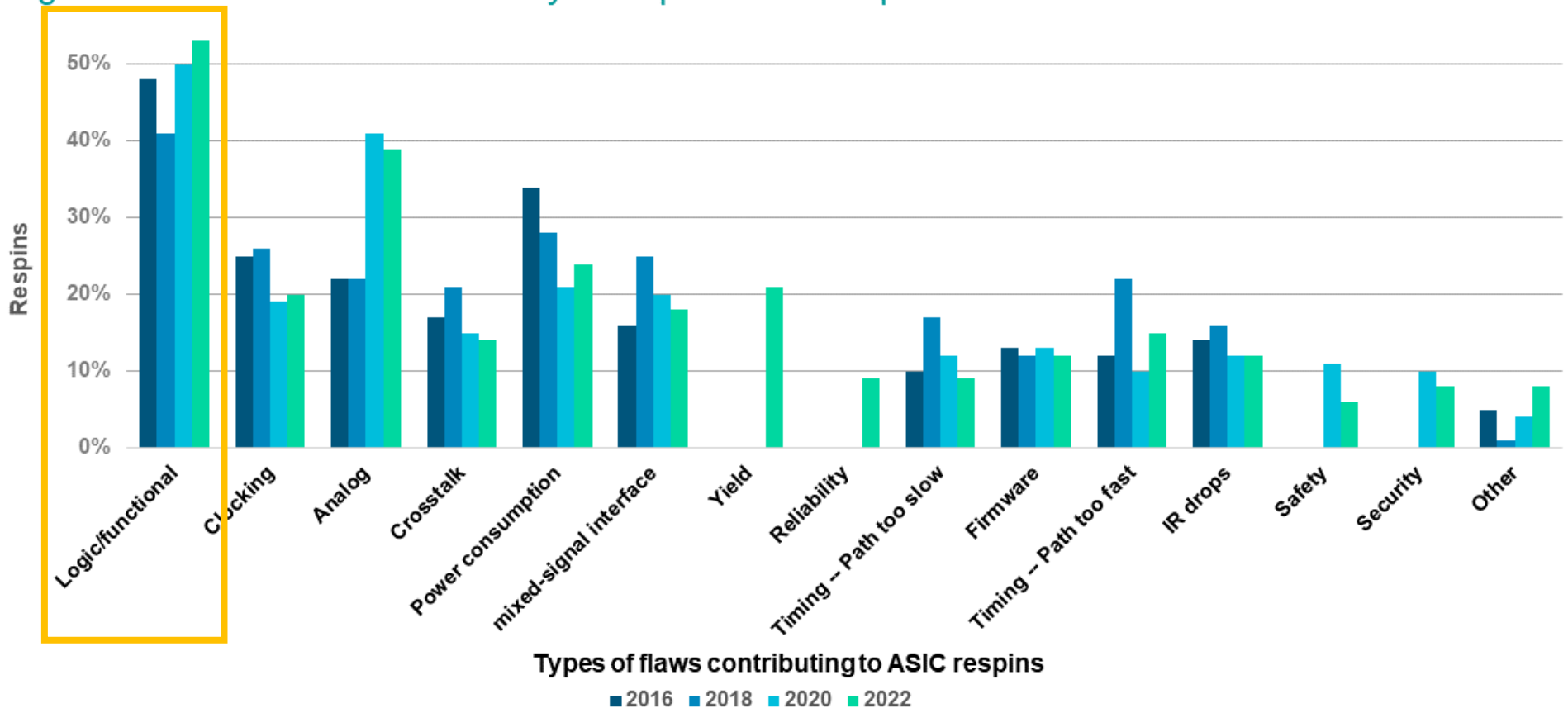
Mask costs (vs 28nm):
12nm 2.5X
5nm 15X
3nm 25X



Source: Wilson Research Group and Siemens EDA, 2022 Functional Verification Study

Cause of ASIC respins

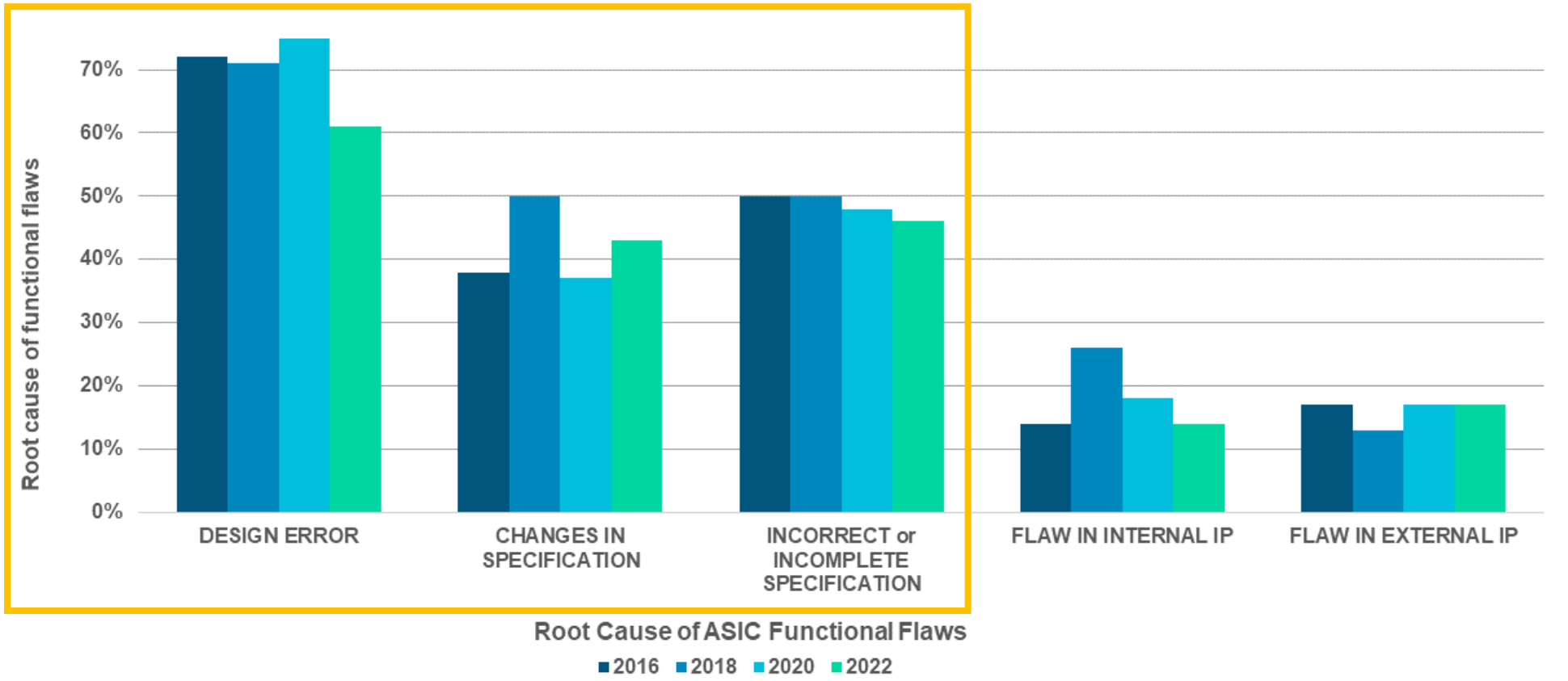
Logic/functional failures consistently the top cause of respins



* Multiple replies possible

Source: Wilson Research Group and Siemens EDA, 2022 Functional Verification Study

Root cause of ASIC functional flaws



Source: Wilson Research Group and Siemens EDA, 2022 Functional Verification Study

* Multiple replies possible

AI/ML Helps on Verification

Big-Data Collection

Planning

Regression

Result Analysis/Debugging

Coverage and Management

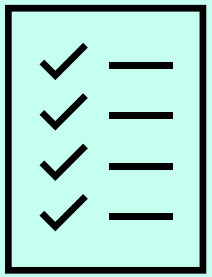
specification

stimulus

coverage bins

technology node

Planning



HDL code

checkers

design info.

submitter

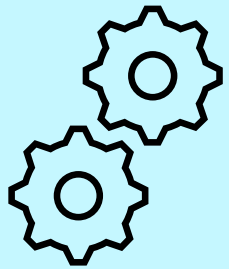
differences

versions

depot path

change frequency

Regression



CPU time

elapsed wall time

memory usage

pass rate/fail rate

fail toggling

failure clustering

stimulus classification

Result Analysis/Debugging

bug type

defected commit

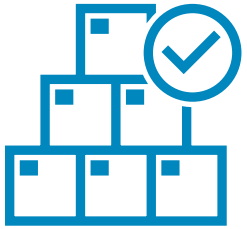
problematic source

turn-around-time

closure trend

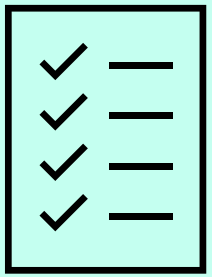
Coverage and Management

improve ratio



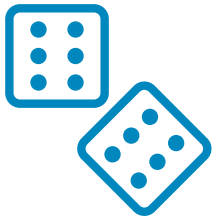
Resource/Cost Prediction

Planning



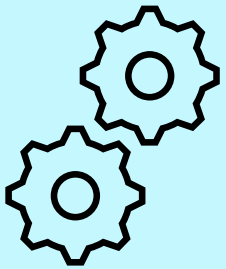
Generative Verification Items

Critical Design Change

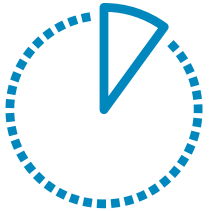


Optimized Random Distribution

Regression



Generated Stimulus



Test Selection

Problematic Commit

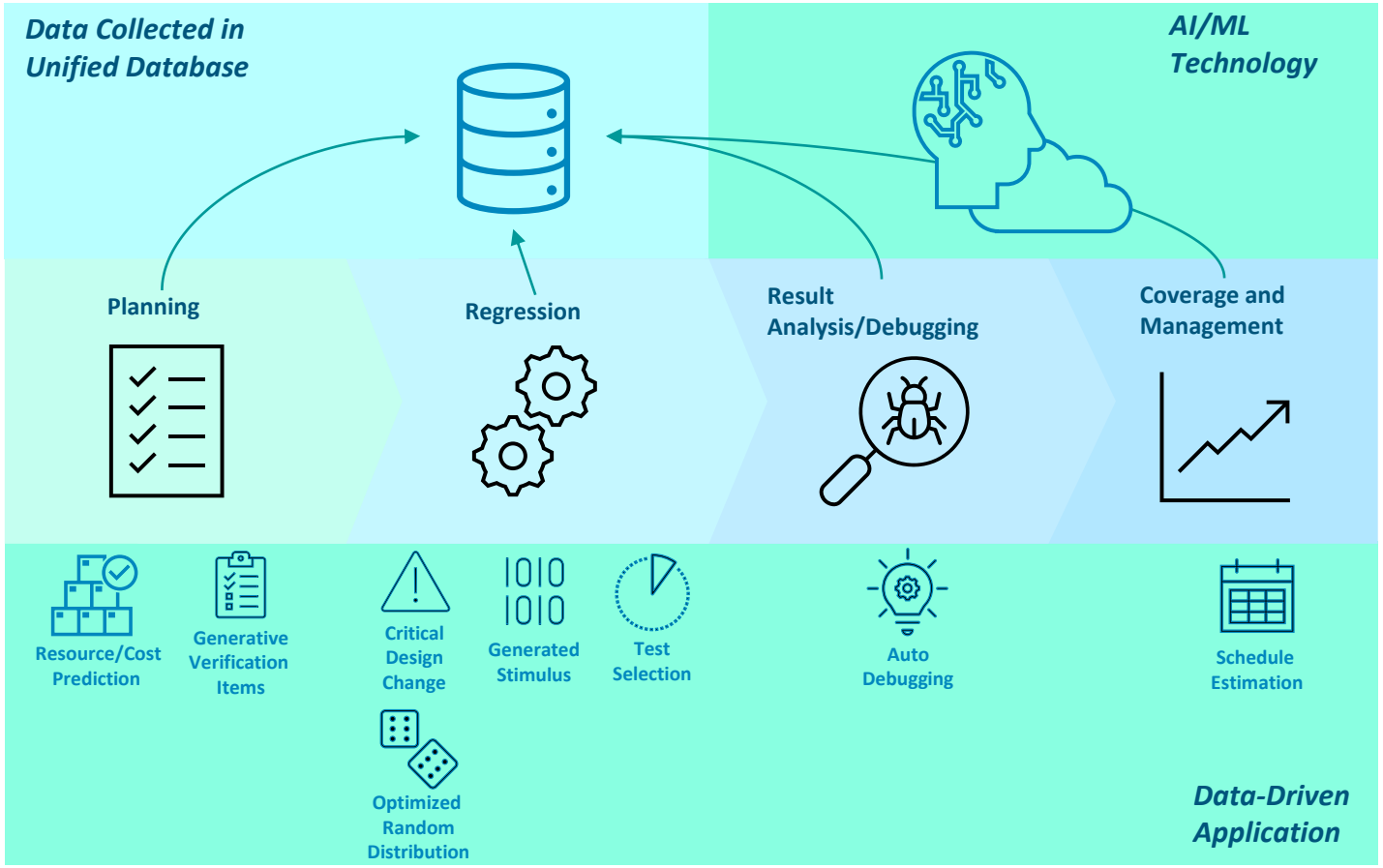
Result Analysis/Debugging

Auto Debugging

Coverage and Management

Schedule Estimation

Data-Driven Functional Verification Process



Question and Discussion

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