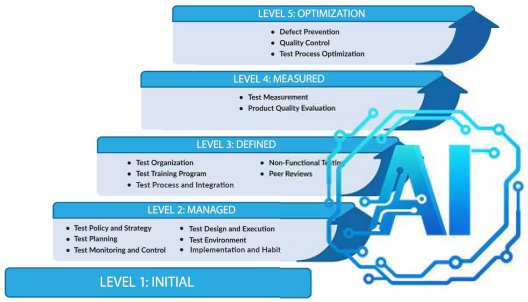
@mprove
IT SERVICES B.V.

Improve Your Testing with TMMi and AI

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What is TMMi?

- TMMi Foundation
  - Develop the TMMi model
  - Framework for TMMi assessments (ISO 33002)
- TMMi model
  - R1.0 (2010), V-model, IEEE, CMMI
  - V2.0 (2026), Agile, DevOps, ISO, AI
- Independent model
- TMMi Local Chapters
- *World leading model* for test process improvement



TMMi Model – Views

Understand where you are and where and how you can improve





LEVEL 5: OPTIMIZATION

- Defect Prevention
- Quality Control
- Test Process Optimization

LEVEL 4: MEASURED

- Test Measurement
- Product Quality Evaluation

LEVEL 3: DEFINED

- Test Organization
- Test Training Program
- Test Process and Integration
- Non-Functional Testing
- Peer Reviews

LEVEL 2: MANAGED

- Test Policy and Strategy
- Test Planning
- Test Monitoring and Control
- Test Design and Execution
- Test Environment
- Implementation and Habit

LEVEL 1: INITIAL





TMMi brings Business Benefits

Enhanced product quality

Reduced product risks

Reduced number of defects



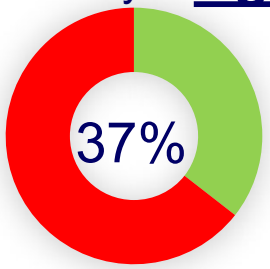


Increased test productivity

Accelerated software delivery

Reduced project costs

Product Quality & **Agile**



Source: 18th State of Agile report (2025)

Product Quality & **DevOps**

Change Failure Rate	Percentage of Users
20%	35%
40%	25%

Source: DORA State of DevOps report (2024)

Individual Benefits Reported



Institution Type	TMMi level	**Software Quality** benefits reported
Bank	3	A 22% increase in defect detection effectiveness
Insurance	3	Production defects (related to testing) close to zero
Bank	3	Defect leaking to production decreased by 15%



Institution Type	TMMi level	**Testing Productivity** benefits reported
Insurance	3	Production cycle time shortened from three months to less than one month
Bank	3	Test execution lead time reduction from 19 to 5 weeks (through early involvement and early testing)
Stock Exchange	3	Percentage of early defects found increased by 25%



TMMi Level 2: Managed

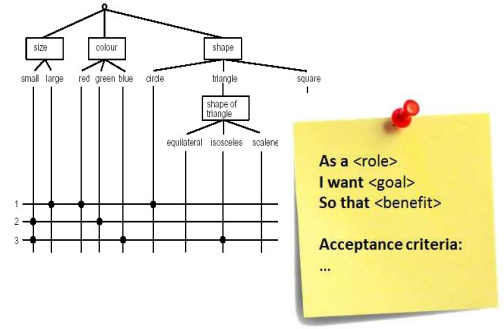
Majority is at TMMi Level 1

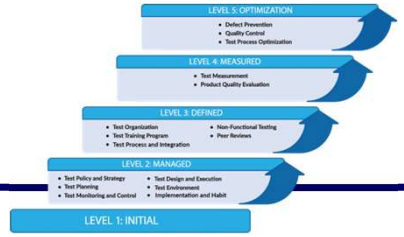


Team oriented process areas

- Test Policy and Strategy
- Test Planning
- Test Monitoring and Control
- Test Design and Execution
- Test Environment
- Implementation and Habit







Implementing TMMi

- Start with an **informal** assessment
- Think business/added **value**
- **Interpret** goals and practices
  - Look for alternative practices – intent
- **One page** “how to” process descriptions
  - Templates, tools and best practice library
- Workshops (address **people** in parallel)
- Forget about TMMi levels 4 and 5





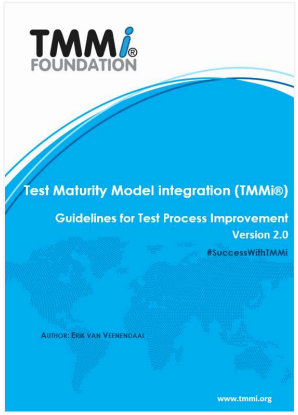
TMMi V2.0

- Stand-alone model
- Emphazing business value
- Agile, DevOps
- Leaning (↓30%)
- Structure (Generic Goals / Generic Practices)
- PeopleProcessTechnology (PPT) Framework
- AI support for TMMi process areas
- Quality Engineering mapping

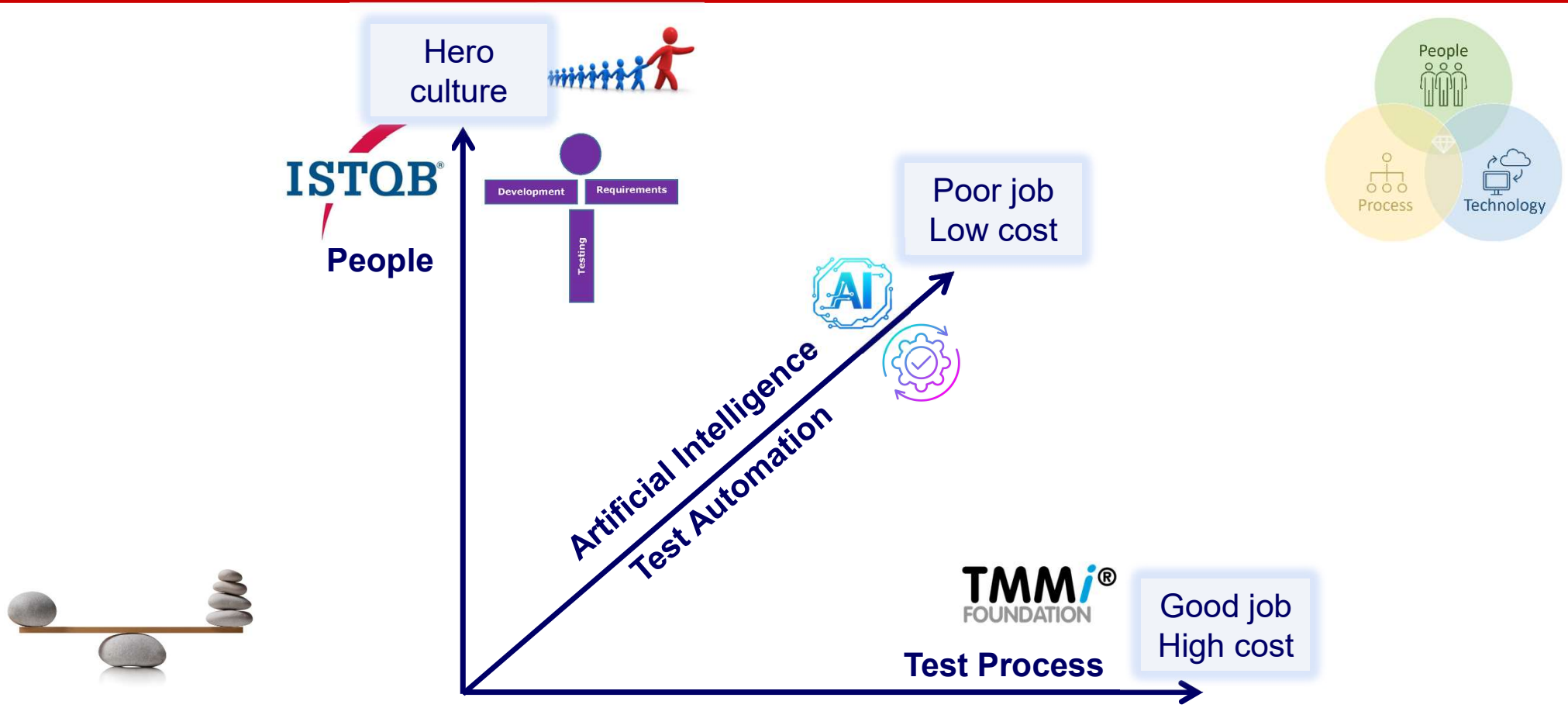


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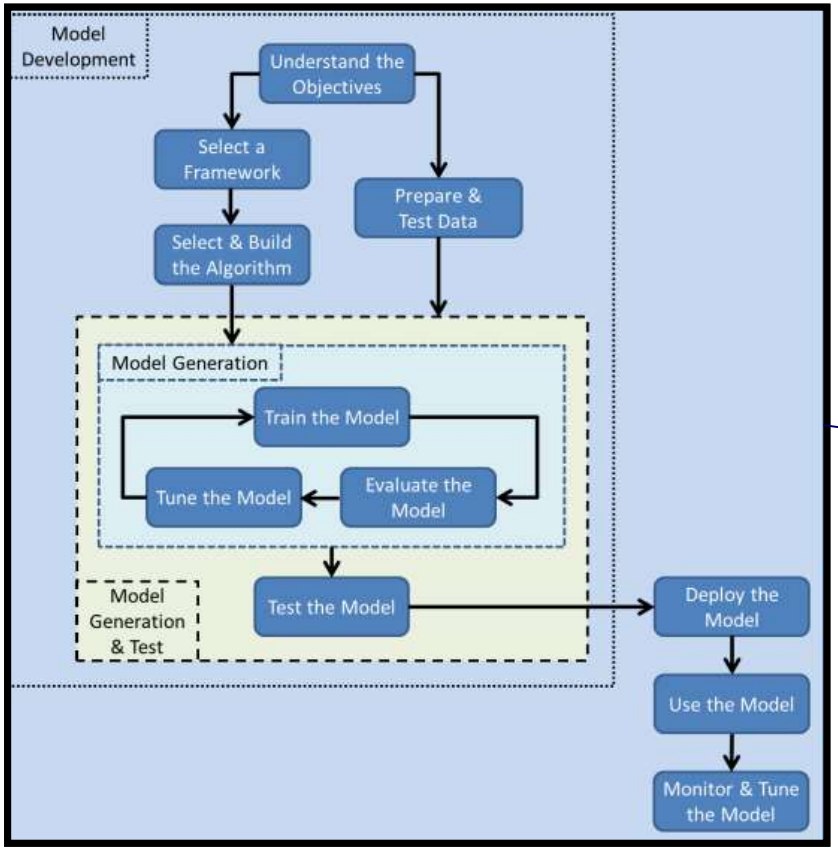
ISO



PPT-Framework – Three ways to improve

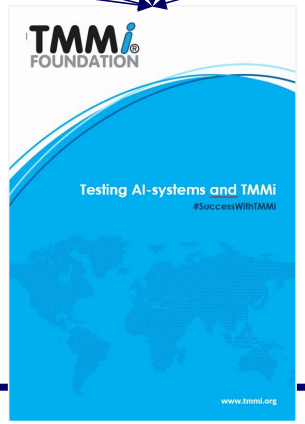


TMMi & AI (1) - Testing AI-based Systems



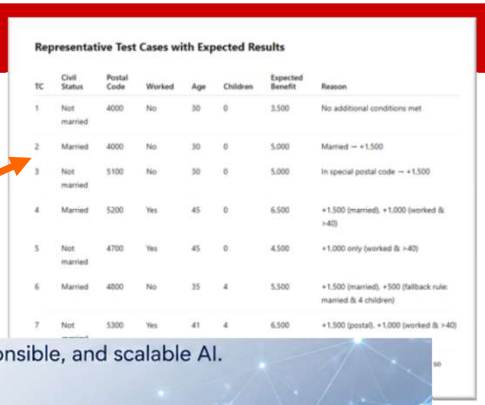
Characteristics	Exit criteria	Techniques
Correctness	Accuracy	Pairwise
Adaptability	Precision	Back-to-back
Transparency	Recall	A/B testing
Robustness	F1-score	Metamorphic
… ISO 20259	…	…





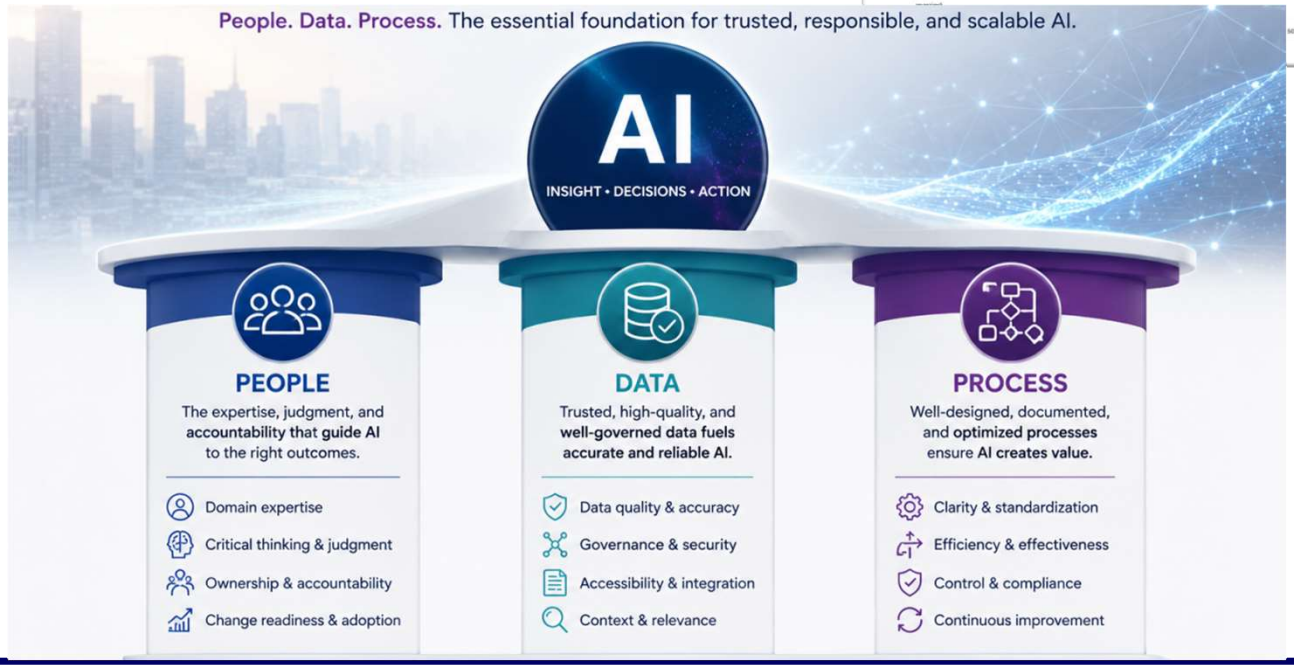
TMMi & AI - (2) Using AI in Testing

- Technology!
- E.g., Test Design and Execution 🙂

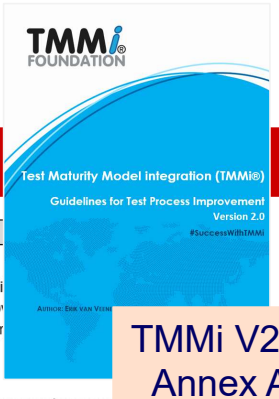


Representative Test Cases with Expected Results

TC	Civil Status	Postal Code	Worked	Age	Children	Expected Benefit	Reason
1	Not married	4000	No	30	0	3.500	No additional conditions met
2	Married	4000	No	30	0	5.000	Married → +1.500
3	Not married	5100	No	30	0	5.000	In special postal code → +1.500
4	Married	5200	Yes	45	0	6.500	+1.500 (married), +1.000 (worked & >40)
5	Not married	4700	Yes	45	0	4.500	+1.000 only (worked & >40)
6	Married	4800	No	35	4	5.500	+1.500 (married), +500 (fallback rule: married & 4 children)
7	Not	5300	Yes	41	4	6.500	+1.500 (postal), +1.000 (worked & >40)



Process Areas and AI Assistance



TMMi V2.0 Annex A

TMMi Level 2 Process Area	(Gen-)AI support and application
2.1 Test Policy and Strategy	**G1 Establish a Test Policy** Providing the test vision of the organization, policy statements and domain context, blended with some examples of test policies, AI can generate a draft test policy that can subsequently be discussed within the organization. **G2 Establish a Test Strategy** Providing AI with a list of reported field defects, allows for a review of the current test strategy and for AI to propose improvements to the defined organizational test strategy. **G3 Establish Test Performance Indicators** GenAI can provide guidance on selecting appropriate test performance
2.2 Test Planning	metrics, process metrics and/or people and organizational metrics. Note that

TMMi Level 4 Process Area	(Gen-)AI support and application
4.1 Test Measurement	**Test Measures** GenAI can provide guidance on selecting appropri with test measurement objectives. It can also pro for the selected test measures. Subsequently, usi gathering and calculate the test measures. **Reporting** AI can summarize and partly analyze test measurement data com objectives, and create reports and charts.
4.2 Product Quality Evaluation	**Product Quality Measures** GenAI can provide guidance on selecting appropriate product quality measures aligned with project's product quality goals. It can also provide the operational

TMMi Level 2 Process Area	Gen-)AI support and application
2.1 Test Policy and Strategy	**G1 Establish a Test Policy** Providing the test vision of the organization, policy statements and domain context, blended with some examples of test policies, AI can generate a draft test policy that can subsequently be discussed within the organization.

TMMi Level 3 Process Area	(Gen-)AI support and application
3.4 Non-Functional Testing	**Usability testing** AI models can be used to determine the acceptability of user interface screens (e.g., by using heuristics and supervised learning). Tools based on these models can identify incorrectly rendered elements, determine whether some objects are inaccessible or hard to detect, and detect various other issues with the user interface. AI-based computer vision can be used to compare images (e.g., screenshots) to identify unintended changes to the layout, the size, position, color, font or other visible attributes of objects. The results of these comparisons can be used to check that changes to the test object have not adversely affected the user interface.
3.5 Peer Reviews	**Perform Peer Reviews** With Gen-AI all types of documents and software code can be reviewed for

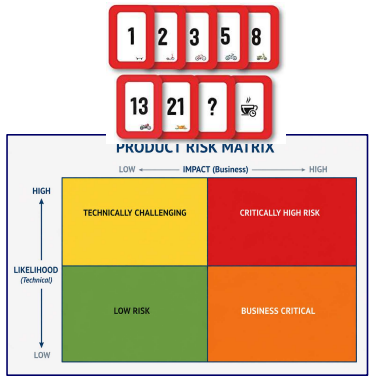
TMMi Level 5 Process Area	(Gen-)AI support and application
5.1 Defect Prevention	**Defect selection** AI can be used to categorize and group reported defects by analyzing text within defect reports and extract topics, such as the area of affected functionality. Also AI models trained on the features of the most critical defects can be used to identify those defects most likely to cause those system failures that account for a large percentage of reported defects and thus need to be prioritized for causal analysis. In addition it can analyze large numbers of defects to identify patterns and recurring root causes.
5.3 Test Process Optimization	**Measure Effects** GenAI can assist in analyzing the effects of the test improvements. Based on this analysis, it can support decisions on whether to continue, adapt or enhance test improvement initiatives.

Using GenAI



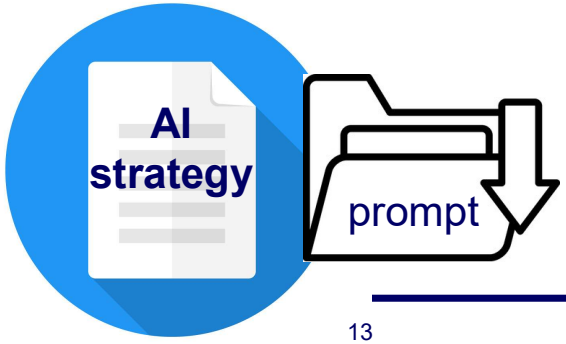


- Trained
- Experiences
- Evaluate

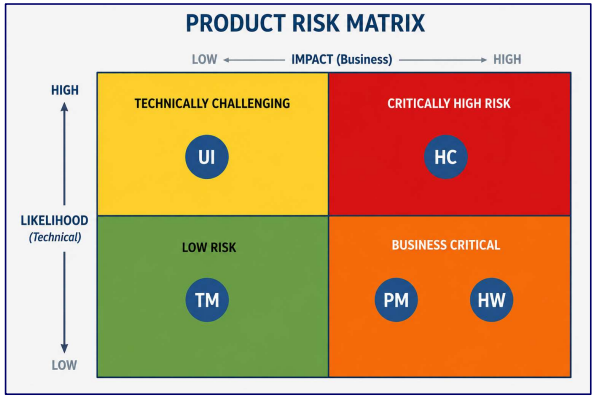




- Defined
- Template
- Checklist
- Examples



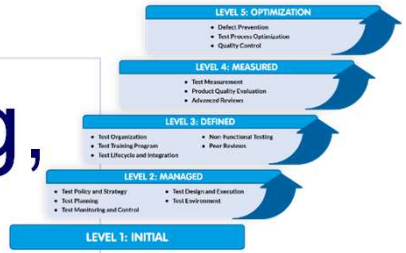
Output GenAI

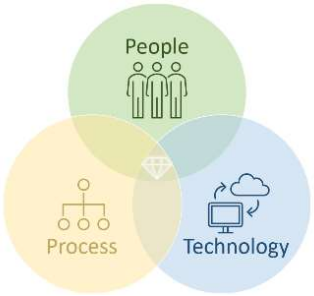


User Story	Likelihood of Defects	Rationale (Likelihood)	Impact of Defects	Rationale (Impact)	Quadrant
UI	High	Completely new UI Design, high complexity, high LOC, major selling feature, usability risks, developed by experienced engineer but largely new functionality	High	Core-customer facing functionality, poor UX directly impacts product attractiveness and usability; high usage frequency	I
PM	Medium	Mostly re-used functionality, moderate complexity, medium LOC, assigned partly to junior engineer, increasing implementation risk	High	Essential operational functionality, inability to power on/off renders machine unusable, affects all users	III
HC	Low-Medium	Very low complexity, small LOC, heavily re-used, implemented by experienced engineer	Very High	Safety critical functionality, failure may cause overheating or fire hazard, severe manufacturer and customer impact	III
TM	High	New functionality added, moderate complexity, handled by experienced engineer, timing/schedule logic often defect-prone	Medium	Convenience feature only, lower usage frequency, failure does not stop core coffee-machine functionality	II
HW	Medium	Existing drivers re-used, but hardware integration always carries technical risk, relatively high complexity, hardware/software integration risks remain	High	Failure may prevent communication with physical machine components, impacts core functionality	III

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If you don’t know what you are doing, don’t do it with AI.









THANK YOU!