

# ENHANCING QIX AWARD MANAGEMENT SYSTEM

## Department of Industrial Systems Engineering & Management

### IE3100R Systems Design Project AY2025/2026



#### SDP Group 12 - NUH 2

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## 01 INTRODUCTION

### Company Background

NUH is a premier tertiary hospital in Singapore recognized for clinical excellence, patient safety, and innovation-driven healthcare. The Quality Improvement (QI) Department manages the IC-QIX Award to empower staff-led Lean initiatives that enhance process excellence and service experience.

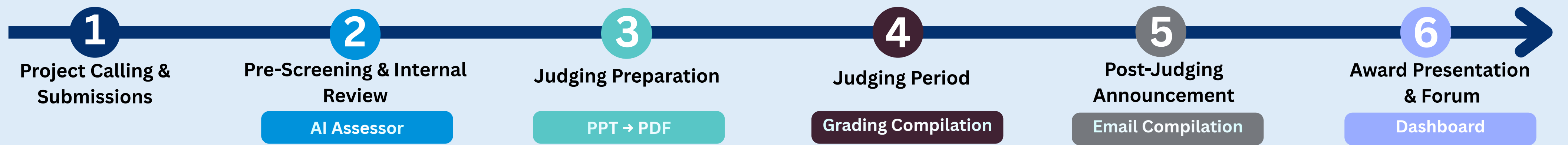
### Problem Statement

The IC-QIX award program currently faces significant operational challenges due to fragmented, manual workflows. Administrative tasks like manual data tabulation, project sorting, and repetitive email customization consume over **63 hours per cycle**, causing rework and limiting capacity for meaningful trend analysis.

### Project Objectives

To develop an **automated** IC-QIX management system that **streamlines administrative workflows** and enhances **data-driven decision-making**. The goal is to identify and eliminate the **highest-impact manual** bottlenecks while ensuring high project categorisation **accuracy** and **real-time visibility** through visual dashboards.

## 02 METHODOLOGY



### 2 Stage 2: Pre-screening & Internal Review

#### Pain Point

#### Manual Pre-Screening

- Manual pre-screening and filtering of every project submission
- Highly time-consuming review
- Risk of inconsistent quality judgements across reviewers

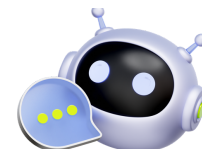
**840 MINS BEFORE**

#### Solution

#### AI Quality Assessor

AI-powered tool (Gemini) that evaluates project submissions during pre-screening, identifying and filtering low-quality or ineligible projects based on defined criteria

**600 MINS NOW**



### 3 Stage 3: Judging Preparation

#### Pain Point

#### Manual File Conversion

- Manual one-by-one conversion of PPT files to PDF format
- Slow and repetitive process

**30 MINS BEFORE**

#### Solution

#### PPT to PDF bulk converter

Automated process that converts all PowerPoint submissions to PDF in bulk, ensuring consistency and eliminating the need for manual, one-by-one file conversion entirely.

**10 MINS NOW**



### 4 Stage 4: Judging Period

#### Pain Point

#### Manual Grading Compilation

- Manual compilation of grading results from multiple judges
- Involves copying hundreds of data points into a master sheet

**60 MINS BEFORE**

#### Solution

#### Grading Compilation (Power Automate)

A Power Automate workflow that extracts scoring data from judges' submitted Excel files and consolidates all results into a single master sheet automatically

**10 MINS NOW**



### 5 Stage 5: Post-Judging Announcement

#### Pain Point

#### Manual Email Preparation

- Manual copying of participant names by award category to Outlook
- Tedious, and prone to omissions
- No scalable way to personalize bulk communications

**120 MINS BEFORE**

#### Solution

#### Email Compilation (Power Automate)

Automated process that extracts participant information from Excel and generates personalised email lists grouped by award type, enabling efficient, accurate sending of customised communications.

**10 MINS NOW**



## 03 AI GRADING ASSISTANT AND DIGITAL DASHBOARD

### 2 Breakdown of Human-Mediated Grading

#### Extraction agent:

It converts messy, unstructured slide text into a clean JSON format that the other agents can easily analyze without getting "lost" in the layout

#### Pre-Screening Agent:

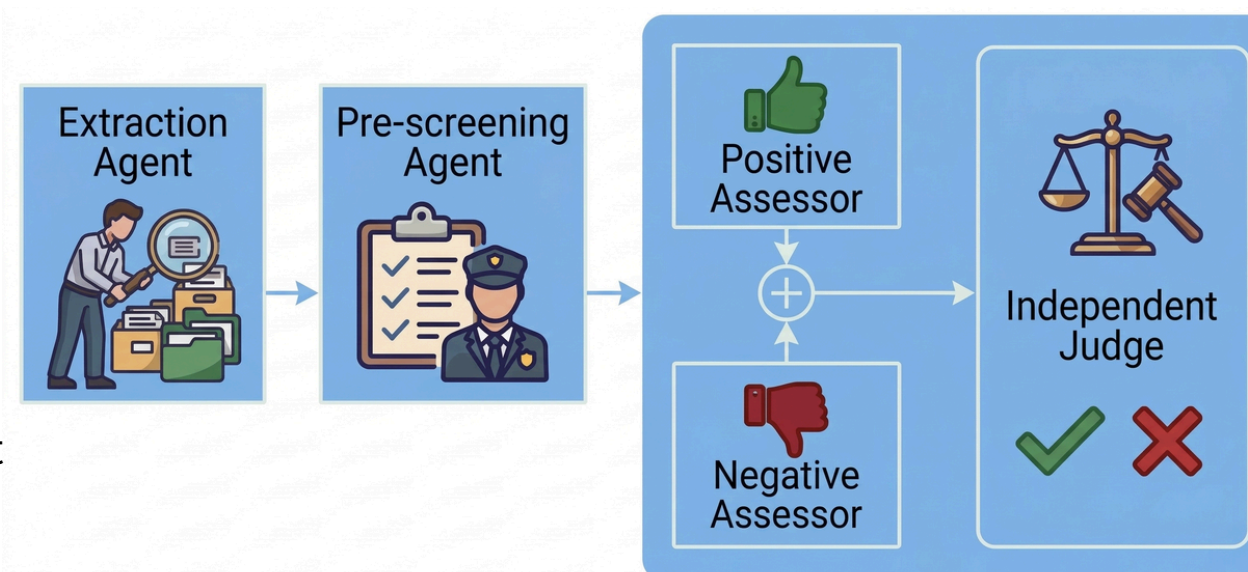
This agent acts as a **strict auditor**. It evaluates submissions against "Level 4" exclusion rules to filter unqualified projects.

#### Grading Component:

To prevent AI "grade inflation," this module uses a Multi-Agent Debate pattern. A **"Positive Advocate"** hunts for strengths while a **"Strict Skeptic"** penalizes any flaws. An **Independent Judge** reviews the transcript to award a final, evidence-based score.

#### Human Mediation (The Final Authority):

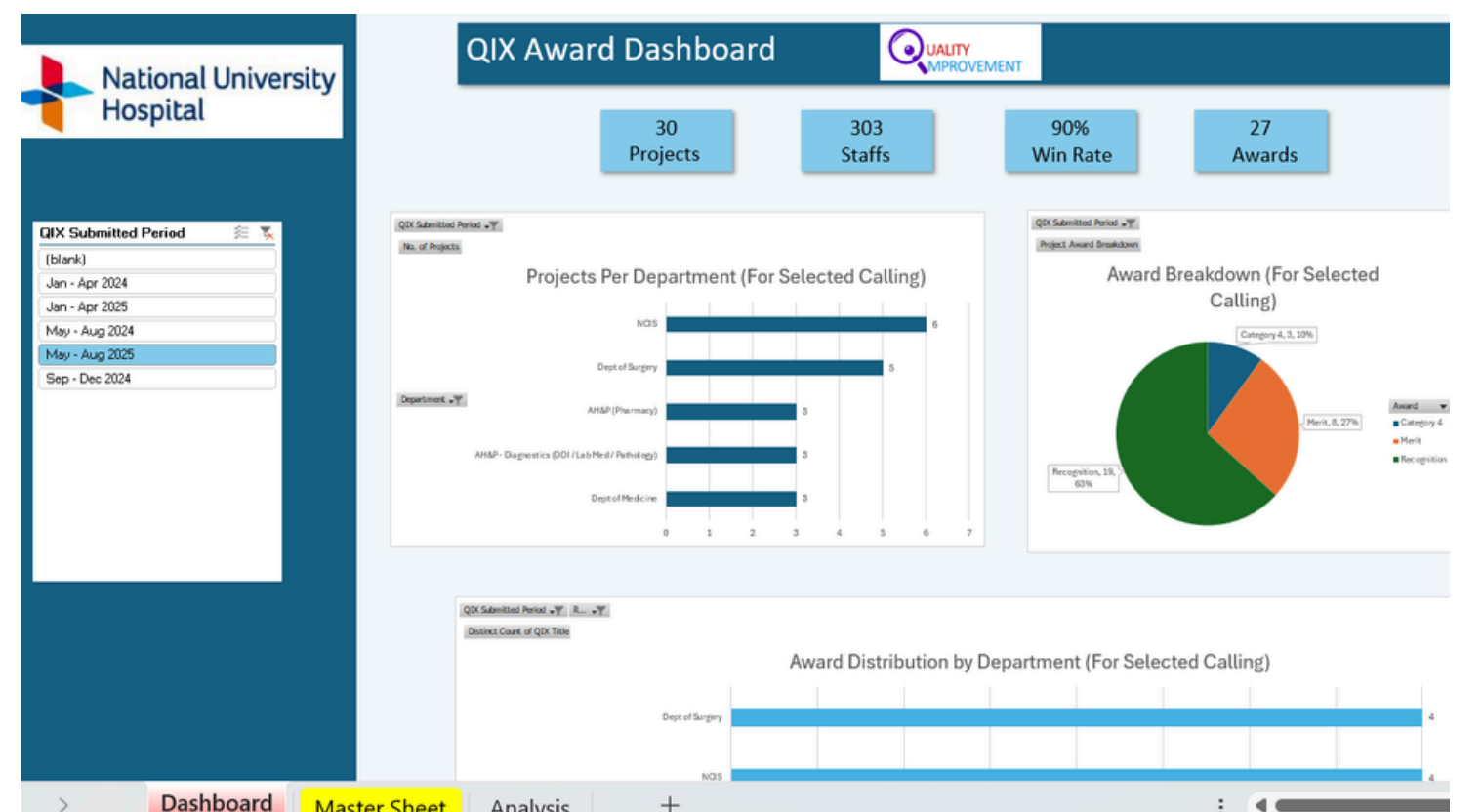
The system exports all AI logic and extracted quotes to Excel. This allows the **NUH Staff** to review the "AI's homework" and manually override scores, ensuring human accountability.



CATEGORY	AI SCORE	HUMAN SCORE	FINAL SCORE	AI JUSTIFICATION	EXTRACTED QUOTE
Problem Analysis	15	12	12	Appropriate lean/PDCA tools including gap analysis then ...	Problem analysis on page 15 states that "..."

### 6 Interactive Dashboard

An interactive **Excel dashboard** that consolidates QIX data into **visual charts and KPIs**, enabling the NUH staff to **track participation, performance, and trends** across submission cycles.



## 04 CONCLUSION

### Achievements

#### Prompt Engineering

- Upskilled staff on Microsoft Copilot for routine tasks – no setup needed.

#### Data Utilisation

- First centralised view of QIX trends, awards and department activity.

#### Reusability

- All solutions reusable every cycle – just re-link and run.

#### Integration of AI

- Encouraged staff to make use of AI for their day to day work

Solutions	Previous Time	Current Time
AI Quality Assessor	840 mins	600 mins
PPT to PDF Conversion	30 mins	10 mins
Grading Compilation	60 mins	10 mins
Email Compilation	120 mins	10 mins
Interactive Dashboard	NA	2 mins
<b>Total Time Saved</b>	<b>21 hour/year</b>	

### Future Developments

- Make use of applications like Power BI instead of Excel for better insights into metrics & visualizations.
- A website to integrate all our current solutions for easy usage.

### Skill Sets Acquired

