

Problem Statement/Title: Data-driven Environmental Services Operations

Desired Outcomes:

NTUC Club (Downtown East) would like to have a centralised Performance Management System (PMS) to manage its facilities, technologies and cleaning workforce.

The PMS should enable the live monitoring of facilities in Downtown East through the integration with the existing smart ES systems/technologies and perform predictive analytics on the data collated to increase both the productivity and task-response time of the cleaning workforce by at least 20%.

This solution should further enhance the management of NTUC Club's outcome-based cleaning contract, such that the required outcome can be derived from data-driven heuristics backed by an artificial intelligence (AI) system.

Preferably, the PMS should be scalable to perform broader level integration to include other facilities management (FM) equipment (*e.g. chiller plant units, lift monitoring, security surveillance systems etc.*) for broader level analytics to enhance the value proposition to NTUC Club and its service providers (SPs).

At a broader level, the system should enable NTUC Club's service partners to continuously upgrade their workforce to stay relevant, and allow the organisation to align with the government smart nation initiative by implementing smart and green technologies.

Background of Problem:

NTUC Club's cleaning services contract is outcome-based. It uses a Quality Audit System to monitor its facilities and evaluate the performance of its cleaning SPs. However, even after adopting such digital technologies, there is still a requirement for NTUC Club managers and cleaning supervisors to perform joint audit inspections, which is time-consuming and unproductive. There is limited traceability, tracking and evidence-based documentation of the service and performance level of the SPs.

Although NTUC deploys a suite of smart system technologies in Downtown East, they are standalone systems. Either the NTUC Club management team or the cleaning supervisor is required to monitor the respective digital systems, which is resource-intensive and inefficient. Furthermore, this inhibits NTUC Club's ability to analyse and correlate data from different sources to derive new insights and operation approaches. The smart ES technologies deployed by Downtown East include:

- (i) Quality Audit Software – Downtown East (Market Square, MUCE, WWW, D'Resort)
- (ii) SMART Toilet System – E!Ave Toilet B @ Level 1 & 2, E!Hub Toilet @ Level 1
- (iii) Smart Watches – 5 Smart Watches current held by the supervisors
- (iv) Smart Bin Sensors – 10 Smart Bins throughout E!Ave
- (v) Autonomous scrubbers - ECOBOT Scrub 75 (Market Square) and ECOBOT Scrub 50 (D'Resort)
- (vi) Smart Rodent surveillance System – 66 units of smart traps throughout common areas @ E!Hub and 82 units of smart traps throughout common areas @ E!Ave

Cleaning services in NTUC Club are routine-based operating on 3 shifts on weekdays and weekends. Each shift deploys between 20-25 cleaners and at least 1 supervisor on site to perform cleaning on toilets, common corridors, building surroundings, lobbies, carparks, bin centres, staircase, lifts and escalators as well as general high touch point areas.

Project Scope:

1. Development of a centralised performance management system integrated to standalone ES digital solutions deployed by NTUC Club.
2. Propose additional smart digital solutions suitable and impactful for deployment in NTUC Club to complement the PMS.
3. Build analytics and intelligence capability into the system for optimisation of workflow, analytics of equipment and/or SPs' service performance, predicting maintenance needs, easing administrative needs of contract administration and planning, and perform repetitive process automation.

Technical Requirements:

1. Ability to integrate with smart ES technologies deployed in NTUC Club (Downtown East).
2. Allow easy real-time monitoring of site's status through a unified dashboard.
3. Alert SPs of ad-hoc, daily and periodic tasks. Automatic sending of ad-hoc tasks from audits or sensor driven data (*cameras, toilet sensors etc*).
4. Capability to track performance and service delivery of cleaning SP.
5. Ability to automate or transform current backend repetitive and administrative tasks.
6. Ease of use of system/products for different levels of users (*e.g. cleaners, cleaning supervisor, FM staff & Managers*) through web-based & app-based platforms.
7. Ensure system availability of at least 99% for the proposed solution.
8. Use predictive analytics to determine when cleaning tasks need to be scheduled to better predict trends for more effective deployment of manpower.

Timeframe for development of proposed solution/product

12-15 months

Requirements of prototype

Prototype should comply with the points listed under Technical requirements.

Business model for proposed solution/product

To propose business model to be adopted by SPs and service adopters for the implementation of the solution.