

## **Project Title**

Transforming Healthcare: The Evolution of Smart Ward at Tan Tock Seng Hospital  
(TTSH)

## **Project Lead and Members**

Project lead: Lim Mei Ling,

Project members: Keefe Tan, Jessica Wong Chor Kwan, Terenna Ng Yun Li, Shirlene Toh, Glenda Lee, Guo Huiliing, Kara Koh, Yakob Bin Haron, Xie Sihui, Lee Yin Yee, Liu Wanzhen, Emilia Fan Aimin, Mohammad Hasri Bin Kamsani, Low Shu Sian

## **Organisation(s) Involved**

Tan Tock Seng Hospital

## **Healthcare Family Group(s) Involved in this Project**

Medical, Allied Health

## **Applicable Specialty or Discipline**

Internal Medicine, General practice

## **Project Period**

Start date: Not Indicated

Completed date: Not Indicated

## **Aims**

See poster appended/below

## **Background**

The healthcare landscape will continue to face challenges presented by an ageing population, complexity of care and a tight workforce. Signaling the urgency to tackle these challenges by embracing innovations and technology rapidly and meaningfully,

Tan Tock Seng Hospital (TTSH) introduced its “Future Ward Prototype”, through the Smart Ward.

Singapore’s public hospitals are large and complex, competing stake holder priorities makes it difficult to reach a consensus. Thus, a ground up innovation may take years before it can be scaled in other departments, delaying the adoption and implementation of healthcare solutions. The specific issue addressed by the Smart Ward initiative was the need to enhance patient care and streamline healthcare delivery processes within the acute ward at TTSH. This involved tackling challenges of transforming our current care paradigm that is fragmented, reactive, and transactional care to one that is connected, enabled, and partnered.

## **Methods**

See poster appended/ below

## **Results**

See poster appended/ below

## **Conclusion**

Holistic communication, agility mindset, and early engagement with stakeholders were critical to the success of the change initiatives. Openness to listen and learn from failure, fostering a “better tomorrow” attitude is critical to keep team going. This conversation allows on going improvement, highlighting its essence of a learning organisation.

Looking ahead, the team aims to devote more time not only within Smart Ward but beyond TTSH, embracing learning opportunities to adopt innovative solutions that enhance the value of care for both patients and staff. As the team persist in revolutionizing care delivery, they are cognizant of the need for careful innovation, effective change management, and maintaining team’s well-being to tackle challenges that may come along the way.

**Project Category**

Care Continuum

Inpatient Care

Care & Process Redesign

Quality Improvement, Value Based Care, Workflow Redesign, Patient Satisfaction

**Keywords**

Patient Care, Healthcare Delivery processes, Acute ward, Caregivers, CHI Evaluation Framework (CHIEF), Technology, Modification

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**Tan Tock Seng**  
HOSPITAL  
National Healthcare Group

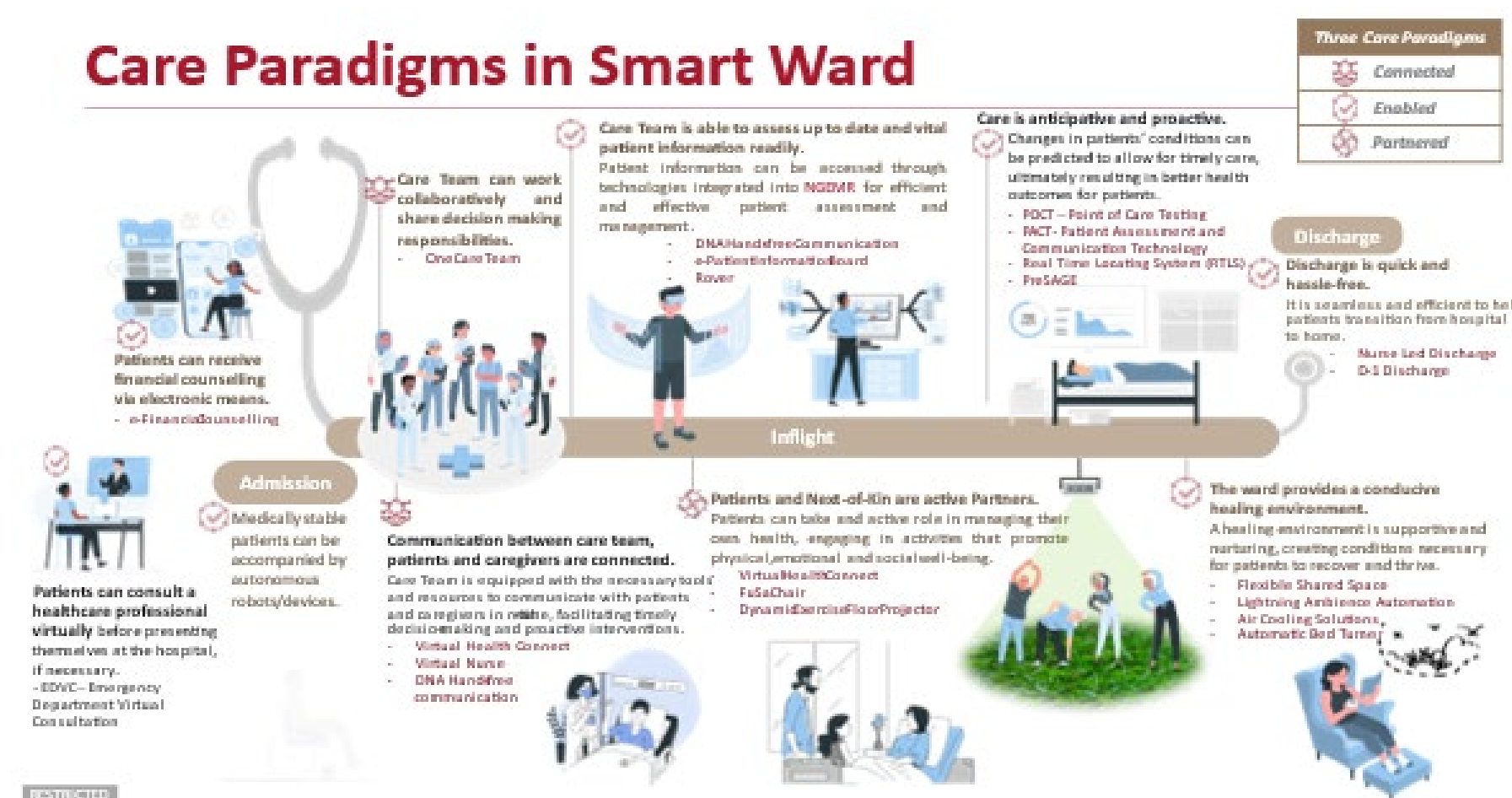
# Transforming Healthcare: The Evolution of Smart Ward at Tan Tock Seng Hospital (TTSH)

Ms Lim Mei Ling, Senior Nurse Manager, Mr Keefe Tan, Associate Consultant, General Medicine,, Ms Jessica Wong Chor Kwan, Manager, Nur & Cri Care Ops, Ms Terenna Ng Yun Li, Executive, Nursing & Critical Care Ops, Ms Shirlene Toh, Principal Occupational Therapist, Allied Health Rehab, Ms Glenda Lee, Deputy Director, Facilities Project Services, Ms Guo Huling, Senior Epidemiologist, OCEAN, Ms Kara Koh, Assistant Director, IT Office, Mr Yakob Bin Haron, Senior Manager, Biomedical Engineering, Ms. Xie Sihui, Principal Pharmacist, Pharmacy, Ms Lee Yin Yee, Associate Consultant, General Medicine, Ms Liu Wanzhen, Senior Nurse Manager, Ms Emilia Fan Amin, Nurse Clinician, Mr Mohammad Hasri Bin Kamsani, Nurse Clinician, Ms Low Shu Sian, Nurse Clinician

## Problem and Background

The healthcare landscape will continue to face challenges presented by an ageing population, complexity of care and a tight workforce. Signalling the urgency to tackle these challenges by embracing innovations and technology rapidly and meaningfully, Tan Tock Seng Hospital (TTSH) introduced its "Future Ward Prototype", through the Smart Ward.

Singapore's public hospitals are large and complex, competing stakeholder priorities makes it difficult to reach a consensus. Thus, a ground up innovation may take years before it can be scaled in other departments, delaying the adoption and implementation of healthcare solutions. The specific issue addressed by the Smart Ward initiative was the need to enhance patient care and streamline healthcare delivery processes within the acute ward at TTSH. This involved tackling challenges of transforming our current care paradigm that is fragmented, reactive, and transactional care to one that is connected, enabled, and partnered.



## Introduction

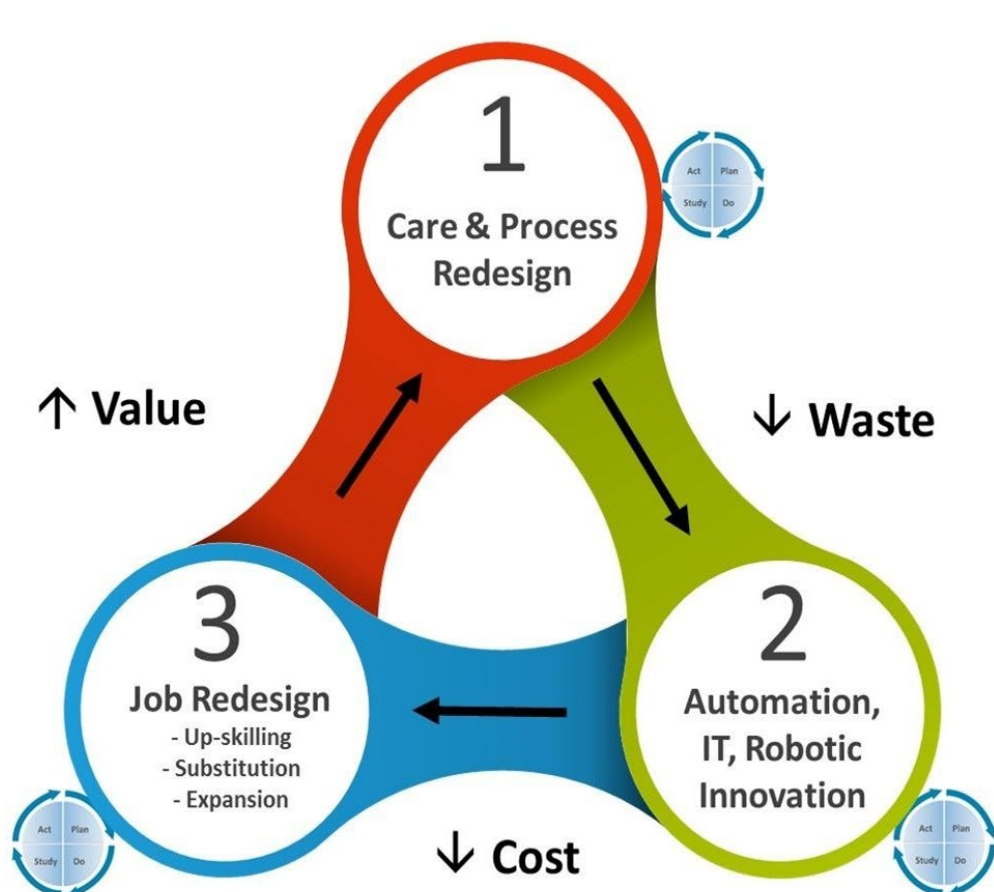
The Smart Ward is situated within mTTSH campus, a 41-bedded acute medical subsidized ward, and is spearheaded by a diverse team comprising doctors, nurses, allied health professionals, and administrators. Patients and their caregivers actively participate, providing invaluable insights and feedback to ensure the relevance and success of innovations trialled within the Smart Ward environment.

Leveraging a robust framework utilizing a logic model, the Smart Ward tests-bed designs, collects data, analyzes costs and risks, and evaluates solutions for potential adoption. To date, over 35 innovations have been evaluated within the Smart Ward, with 16 initiatives already scaled to other wards. The Smart Ward serves as a real-life sandbox, fostering ongoing efforts to revolutionize the care paradigm.

## Intervention

Smart Ward team embraces the agility and autonomy to swiftly make collective decisions, including whether to further scale initiatives or not. This autonomy allows them to implement decisions quickly and safely, without being bogged down by conventional approval processes. The Smart Ward serves as a real-life sandbox, fostering ongoing efforts to revolutionize the care paradigm. To address roadblocks and synergise values, the Smart Ward team leaders collaborated with TTSH's Kaizen Office to conduct a Design Workshop instead of immediately diving into testing numerous innovation projects. This internal alignment enabled the team to:

- effectively communicate their vision and desired outcomes to senior management to garner support,
- prioritize and evaluate projects for testing based on a robust framework.



The Innovation Cycle enables a systems approach to Healthcare Innovation – Care Redesign, Enabling Technologies and Job Redesign. Through job redesign, the team aim to sustain and scale the change by empowering our Healthcare Worker with better jobs. In TTSH, we believe that this is the future of healthcare, where every healthcare worker owns his job and can change his job to deliver better care and better value.

## TEST FAST

- All tests will require approval from Smart Ward Team Lead.
- Tests to demonstrate intended value and outcomes of Smart Ward.
- Primary focus on validated/readily available solutions (80%) such as robot and secondary focus on nascent technology that require validation (20%) such as PreSAGE.
- Test period to be at maximum 1 month.
- Each test to be capped at either OPEX < \$10,000 or CAPEX < \$100,000. OPEX is suitable, given that testing will be via "rental model" or "non-fixed asset" solution. An IO code to be created under Ward 5C cost centre to track the costs incurred.

## LEARN FAST

- Each test will be evaluated using CHI Evaluation Framework (CHIEF).
- Successful test(s) to showcase through submission of research paper or posters.
- A platform will be set-up to showcase the tests-in-progress in order to share best practices and obtain feedback from staff and patients.
- Smart Ward Team will recommend the test projects that can be scaled.

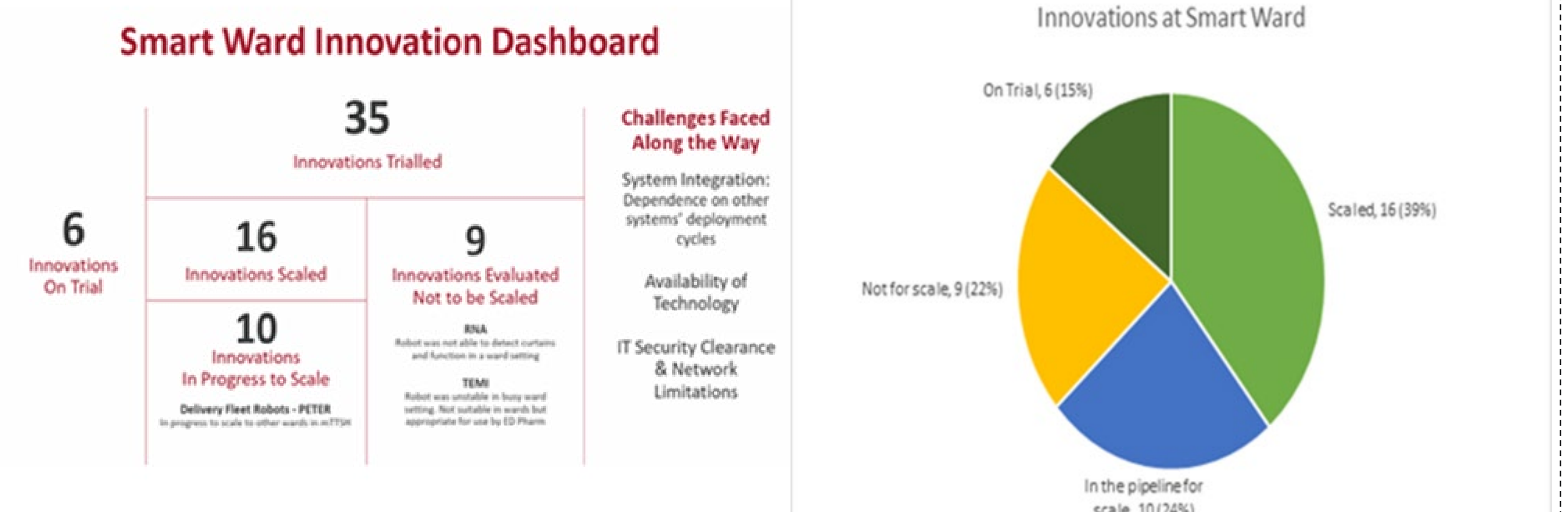
## SCALE FAST

- Process Redesign – To seek approval at relevant platforms such as Clinical Board for changes to the care model.
- Solution Implementation – To budget for CAPEX / OPEX for the next Financial Year, through the annual budget submission.
- Job Re-design – To work with respective workforce leadership and HR to scale redesigned jobs.

## Results

In our relentless pursuit of excellence in healthcare, the Smart Ward embarked on a transformative journey, testing a total of 35 ground-breaking innovations.

Please refer to Annex A for details.



Almost 40% of the innovations that have successfully progressed beyond the trial phase, significantly enhancing the operations of wards. About 1/4 of the total are the pipeline for scaling. ~20% did not fully align with the predefined criteria for scalability. These innovations require further modifications or improvements to better meet our goals and operational standards. Currently, 6 innovations are undergoing trials as part of Smart Ward's ongoing commitment to innovation and improvement.

Smart Ward also hosted internal and external guests through physical or virtual tour since officially launched and they expressed interest to partner and expand Smart Ward ideals beyond TTSH and Singapore.

## Conclusion

Holistic communication, agility mindset, and early engagement with stakeholders were critical to the success of the change initiatives. Openness to listen and learn from failure, fostering a "better tomorrow" attitude is critical to keep team going. This conversation allows ongoing improvement, highlighting its essence of a learning organisation.

Looking ahead, the team aims to devote more time not only within Smart Ward but beyond TTSH, embracing learning opportunities to adopt innovative solutions that enhance the value of care for both patients and staff. As the team persist in revolutionizing care delivery, they are cognisant of the need for careful innovation, effective change management, and maintaining team's well-being to tackle challenges that may come along the way.