



## Application of digital twin tools to test Models of Care and health infrastructure planning assumptions

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# The problem to solve

How might we deliver a **data informed redeveloped Emergency Department (ED)** of the future to meet the needs of predicted growing demand with certainty and deliver excellence in:

- Patient experience of care
- Clinical outcomes
- Provider experience of care
- System sustainability – organisational and environmental

## Intended outcome:

**Not just building bigger** – ensuring new models of care and redeveloped ED fit for purpose



# Background

- Redevelopment of a prestigious Australian tertiary and quaternary metro hospital – inclusive of the redevelopment of the existing ED
- Significant growing demand identified for the ED and the acute specialised services of the hospital facility
- Resource constrained physically and financially so need to understand the implications of decisions

## Opportunity:

Leadership aligned to test innovation opportunities and new approaches to challenge traditional facility planning approaches

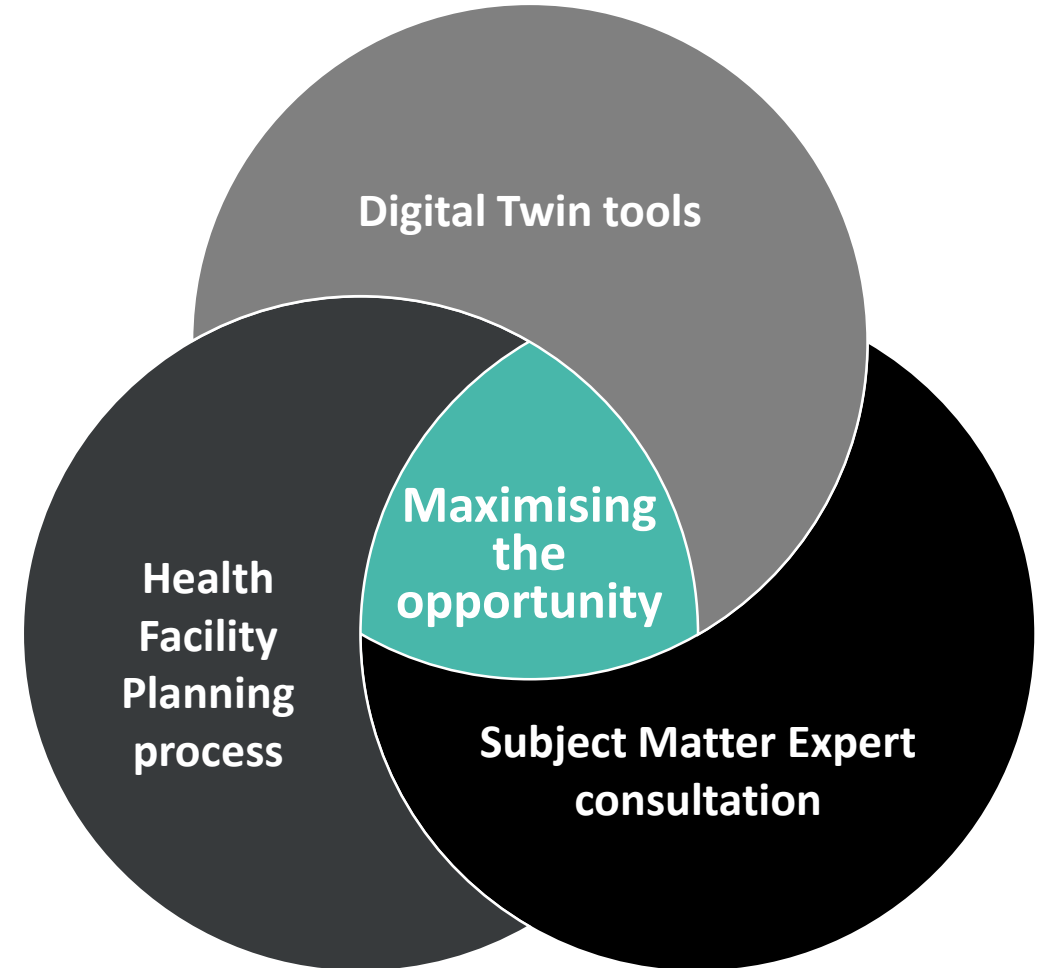


# How did we solve this problem?

- A new, integrated approach applied - integration of **Digital Twin tools** with 'traditional' Health Facility Planning processes and user consultation

The approach enables Subject Matter Experts to:

- Test (and fail) and retest in the digital space – fail safe prior to significant capital infrastructure investment and potentially putting patient outcomes at risk
- Rapidly iterate and quantify the differences between multiple scenarios across a multitude of KPIs





# What is a Digital Twin?

- Logic and data driven informed virtual / digital replica of an object or system that mirrors its real-world characteristics and behaviors
- It helps predict the performance of a complex system when faced with variability, randomness and change
- In summary, a Digital Twin enables businesses to make data driven decisions



# Digital Twin methodology



## Establish

the objective – what are the questions to be answered / the unknowns to be explored



## Engage

subject matter experts and organisational leaders to develop a dataset and model design based on historical data



## Apply

the information with the department layout and zones



## Build

the digital twin



## Validate

that the model appropriately replicates performance



## Test

scenarios and run experiments to adjust various elements



## Analyse

the outcomes to communicate relationships and highlight value drivers through data visualisation tools and techniques

# Design decisions investigated – what we tested

Tested and investigated the future performance of the ED under a number of scenarios including:

- Patient arrival forecasts
- Alternate and new models of care
- Various ED infrastructure requirements, i.e., number of patient rooms, bays, etc.





## Benefits of applying digital twin tools



Engagement and collaboration between key stakeholders



Design decisions based on quantitative measures rather than opinion



Reduced time to achieve buy-in on design decisions

# The future of digital twins in health planning

- Early testing of clinical activity projections and models
- “Whole of facility” (and system?) patient flow planning and design
- Bringing the change forward – supporting change management and adoption for operational readiness
- Inform planning of future models of care and design with data driven insights
- Inform resource requirements such as workforce and equipment





# Thank you

**TSA**  
Advisory



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