

Challenge Based Innovation for CNS



Improving hospital cleaning service

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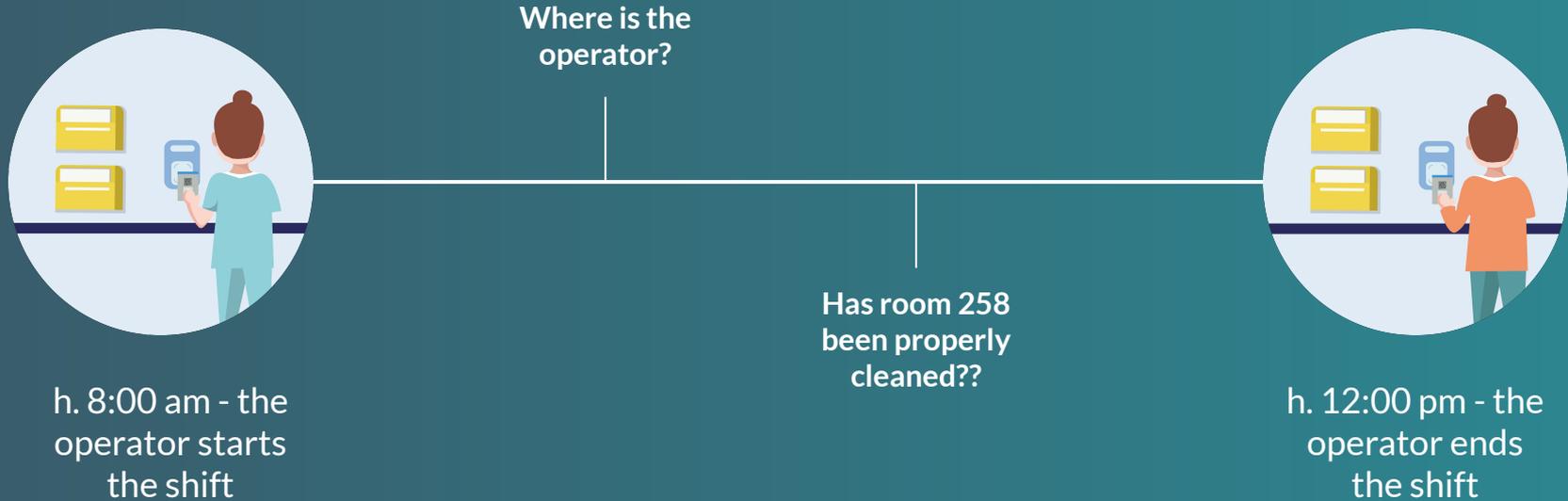
Chiara Vagnini

Challenge definition

How might we help CNS to innovate the hospital cleaning services and increase its awareness towards the service it provides?



Hospital cleaning service: state of the art



CNS would gain more information about the service

Goals

Empowering **CNS** by providing
evidence that
the work has been performed

+

Improving the **cooperative**
productivity by determining how
the work has been performed

ClinX

Cleaning Innovative Experience



An ecosystem capable of collecting data on the cleaning activity triggered by the interaction of the operators with different smart objects.

ClinX



**CLEANING
AUTHENTICATION
SYSTEM**

+



**CLEANING
ACTIVITY MONITORING
SYSTEM**

CLEANING AUTHENTICATION SYSTEM



Cleaning authentication system

WHAT IS IT?

Cleaning authentication system is an **NFC based device** composed of a fixed tag and a movable reader.

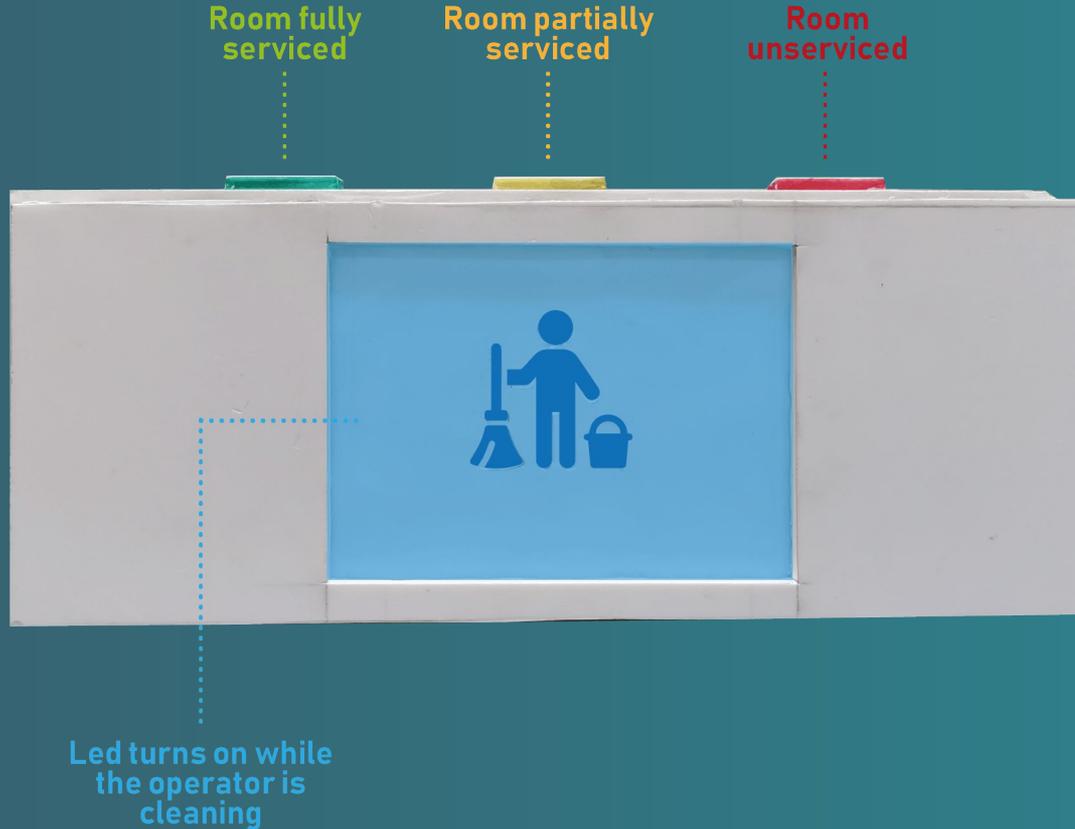
The tags are placed on the walls next to each room entrance, while the reader is located into a device held by the operators.

The device is stored in a dedicated spot on the cart.



Cleaning authentication system

HOW DOES IT WORK?



Cleaning authentication system

COLLABORATIVE INVOLVEMENT



Thanks to this device all the people living the hospital will be aware of the undergoing cleaning service. This, in turn, should reduce unnecessary interruptions of the operators.

Cleaning authentication system

FEATURES



Identification
of the cleaning
operator's position



Active
self-certification
of the work done

CLEANING ACTIVITY MONITORING SYSTEM



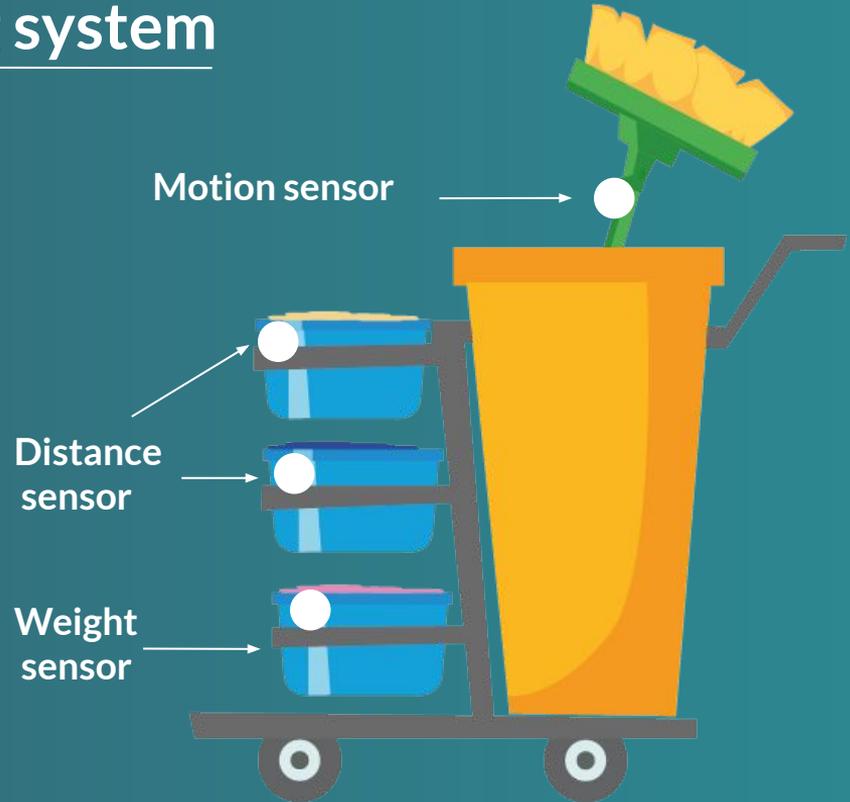
Cleaning activity monitoring system

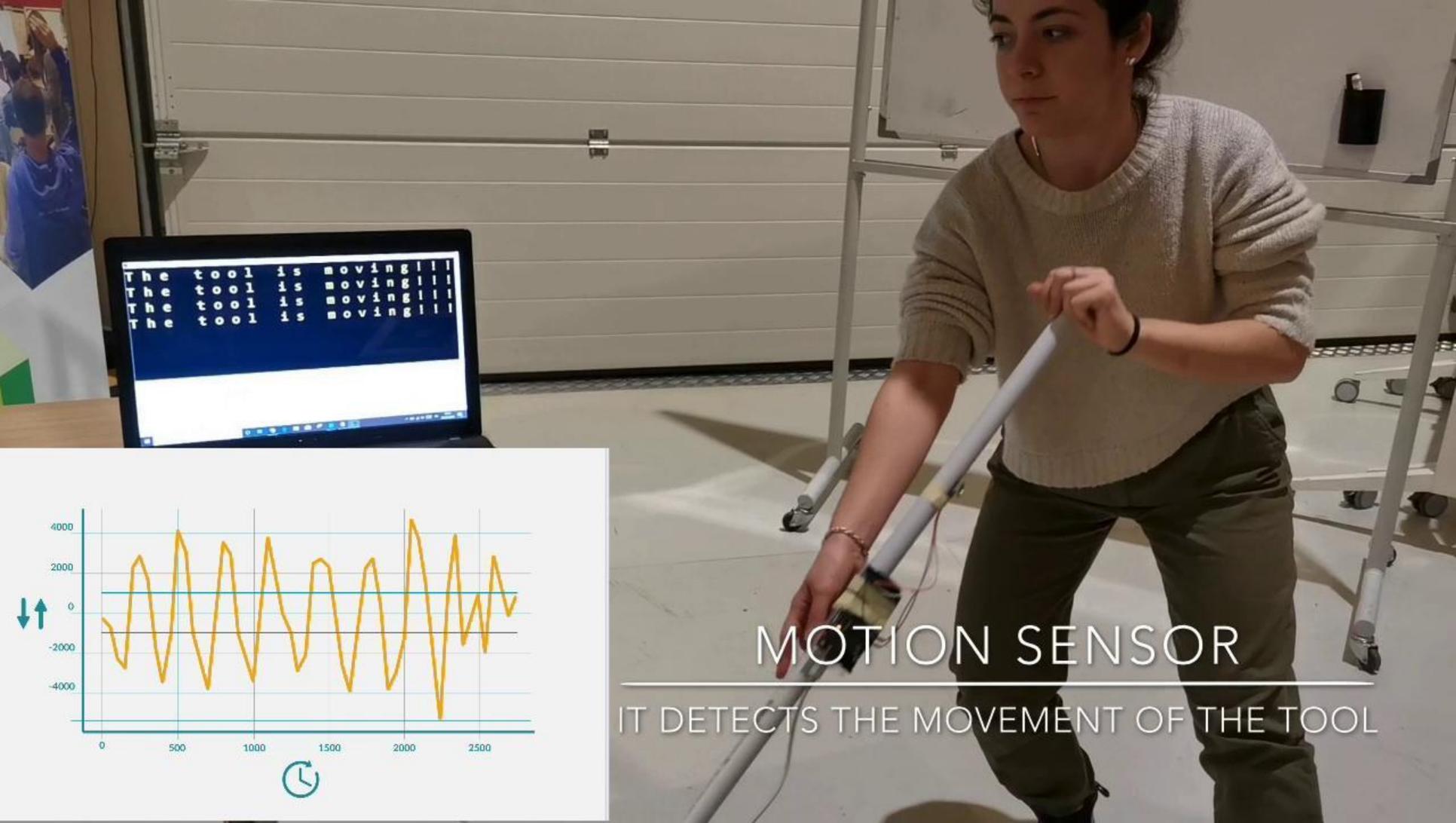
HOW DOES IT WORK?

It is composed of different sensors:

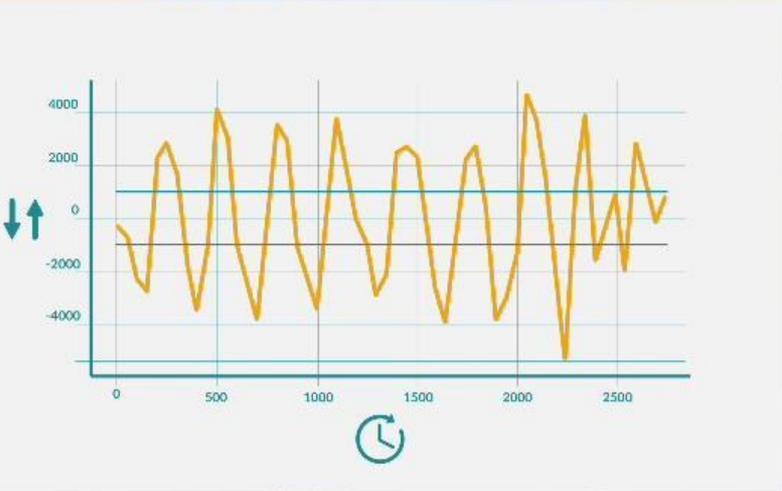
- **Distance sensors** to count the number of tissues used for the cleaning activity;
- **Weight sensors** to detect how much cloth has been picked;
- **Motion sensors** to understand whether the cleaning operator is using some of the tools.

Moreover, the system analyzes whether the tools have been used in the correct order as stated in the cleaning protocol.





The tool is moving!!!
The tool is moving!!!
The tool is moving!!!
The tool is moving!!!



MOTION SENSOR
IT DETECTS THE MOVEMENT OF THE TOOL



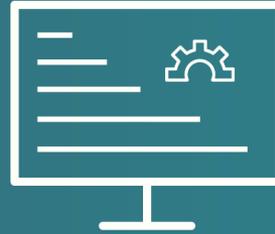
DETECTS THE NUMBER OF TISSUES USED

Cleaning activity monitoring system

FEATURES

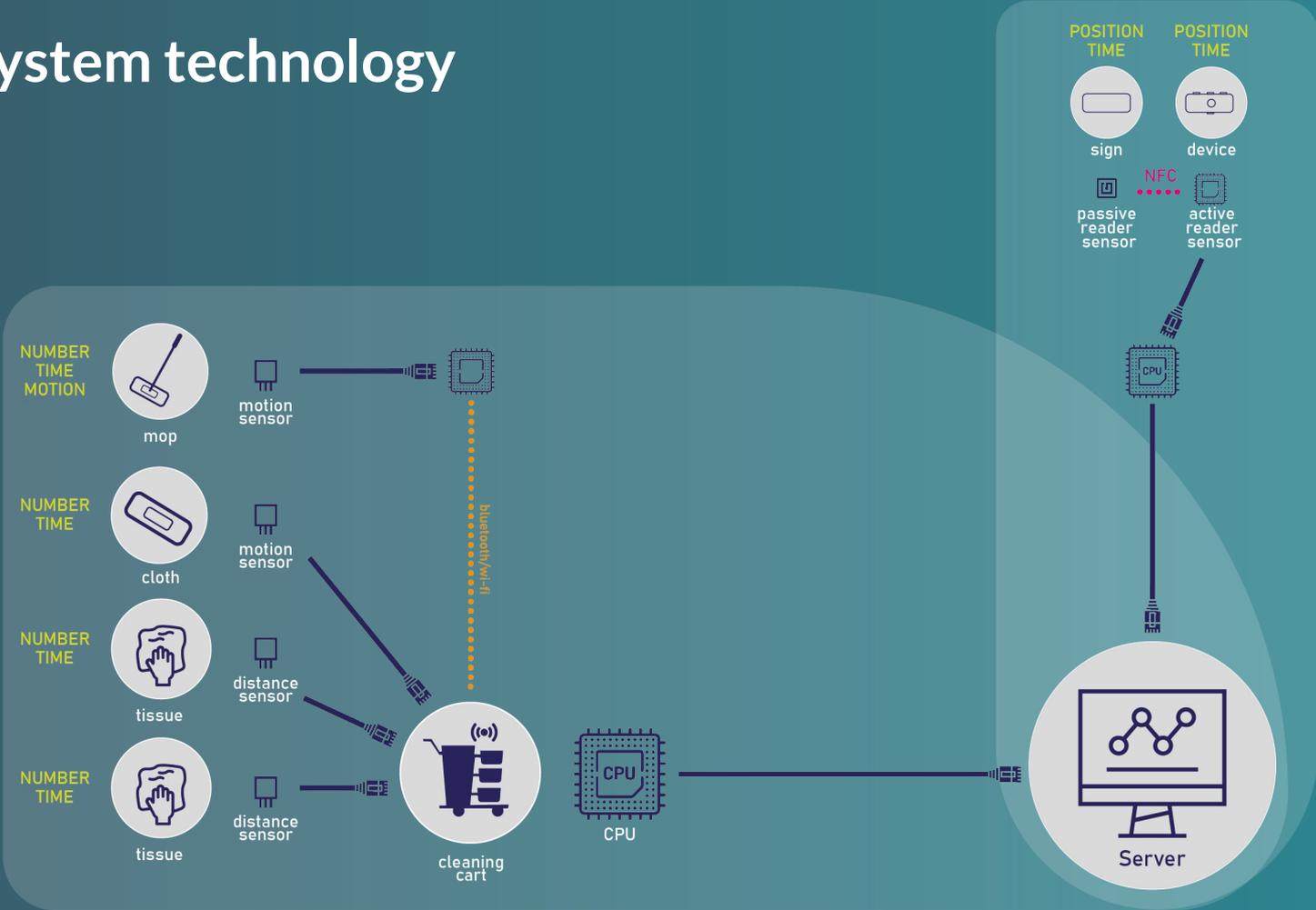


Passive
certification
of the work done



Information
about service
productivity

Ecosystem technology



Data processing

CLEANING AUTHENTICATION SYSTEM



Position
Room starting time
Room ending time
Room total cleaning time
Overall cleaning time
Rooms unfinished
Rooms unserviced

CLEANING ACTIVITY MONITORING SYSTEM



Number of tissues used
Amount of cloth used
Actual time of tools usage
Sequence of tools used
Compliance with tools sequence required

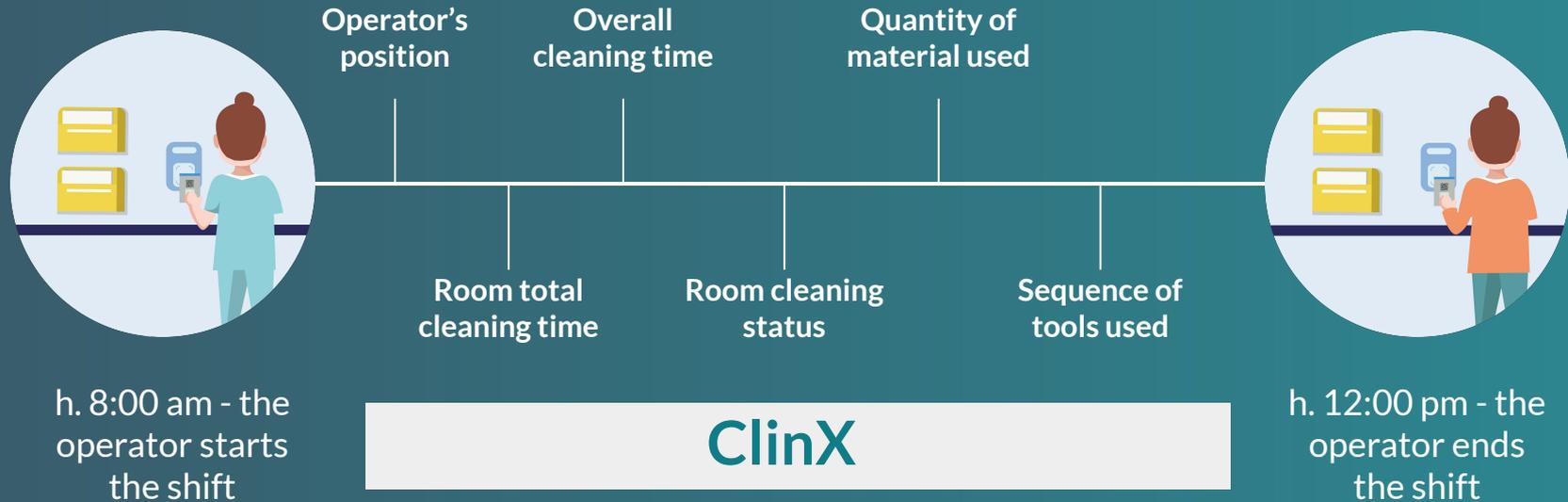


MANAGEMENT SYSTEM

Data analysis

KPIs formula	KPIs definition	Added value
$\frac{\text{Tissues Used}}{\text{Tissues Provided}} \times 100 [\%]$	Tissues used over provided ones	Indication on the correct use of materials
$\frac{\text{Mean of Tissues Used per Ward}}{\text{Mean of Tissues Used per Department}} \times 100 [\%]$	Average tissues used per specific ward compared to the department	Identification of the most material demanding wards
$\frac{\Sigma \text{ Rooms Total Cleaning Time}}{\text{Shift Hours}} \times 100 [\%]$ $\frac{\text{Surface Cleaned}}{\text{Shift Hours}} \times 100 [\%]$	<p>Effective cleaning time per shift</p> <p>Effective surface cleaned per shift</p>	Analysis on the time efficiency of the service
$\frac{\Sigma \text{ Rooms Unfinished} + \text{Rooms Unserved}}{\text{Numbers of Rooms}} \times 100 [\%]$	Rooms unserved over total rooms	Indication of the frequency of the external factors

Hospital cleaning service: our vision



Thanks for the attention

