

SMART HOTEL TECHNOLOGY GUIDE 2019

Using Technology to Transform the
“Heart”-of-House



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ABOUT THE SMART HOTEL TECHNOLOGY GUIDE

International visitor arrivals from the Asia-Pacific are projected to grow by 5.5% annually from 2018 to 2023¹, and Singapore's tourism is poised for growth, with exciting tourism developments on the horizon.

To ride this growth, the local hotel industry must continue to innovate and transform to seize opportunities and overcome challenges from increased competition, manpower shortage, and changing guest expectations. It is vital for hotels to understand and leverage emerging technologies to augment existing processes, as this will help optimise productivity, enhance service delivery, and ultimately, grow profitability.

The Hotel Innovation Committee (HIC), led by the Singapore Hotel Association and supported by the Singapore Tourism Board, serves this need by identifying innovative solutions that will benefit and transform the hotel industry.



In 2018, the HIC launched the Smart Hotel Technology Guide 2018 to help hotels identify technological solutions that can transform guest experiences in nine critical guest journey segments.

This year, the 2019 Guide was put together to help hotels tap data and Smart technologies to transform their “heart”-of-house – employees, processes, and overall business growth. It also explores Smart ways to leverage data and enabling technologies to assist sustainability efforts without compromising guests’ comfort.



Transformation is rapidly disrupting the hospitality industry – and it is here to stay. Hotels can consult both the 2018 and 2019 guides, which contain a series of technology solutions and case studies, for ideas on how to kick-start their Smart Hotel journey.

¹ Pacific Asia Travel Association (PATA) Asia-Pacific Visitor Forecasts 2019–2023 Report

TRENDS SHAPING THE HOTEL INDUSTRY



² The Wall Street Journal, "Millennials Prize Experience. Now So Do Travel Companies" (June 2019)

³ Booking.com, "Sustainable Travel Report 2018"

⁴ Global Wellness Institute, "2018 Global Wellness Economy Monitor"

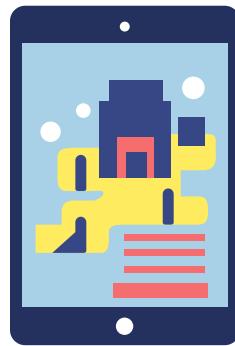
⁵ EHL, "Top 10 Trends Reshaping Hospitality in 2019" (2018)

MOVING AHEAD WITH INNOVATION & TECHNOLOGY

Hotels can leverage data and technology in an innovative way to move ahead in all aspects of the hospitality business – which includes fulfilling guest expectations, streamlining operations, improving pricing strategies and becoming friendlier to the environment.

FOR GUESTS

Hotels are guest-centric businesses – happy guests spend more, and they will return. The **Smart Hotel Technology Guide 2018** identified nine critical guest journey segments, where hotels can leverage technology to offer Smart and differentiated value propositions to engage guests and heighten experiences.



[CLICK HERE TO REFER TO THE 2018 GUIDE.](#)

FOCUS OF THE 2019 GUIDE

FOR EMPLOYEES

The hotel industry presents many opportunities to adopt technology and innovation to drive operational efficiency. Currently, many hotel operations are labour-intensive, time-consuming and unproductive. Embracing technology and automation in both the front and “heart”-of-houses can free employees to focus on providing quality, unique experiences to guests.

It can also create a more conducive work environment, and help redesign jobs to meet the career expectations of younger job seekers.



FOR HOTEL OWNERS AND OPERATORS

Technology and innovation offer a variety of cost savings and revenue opportunities. They can also create new services and offerings that were previously not possible, e.g. hotels can now engage visitors in their native languages via chat-bots to facilitate service requests, improving guest experience and encouraging spending.

Overall, technology can help hotel owners reach new levels of sustainability – in terms of the environment as well as overall profits.



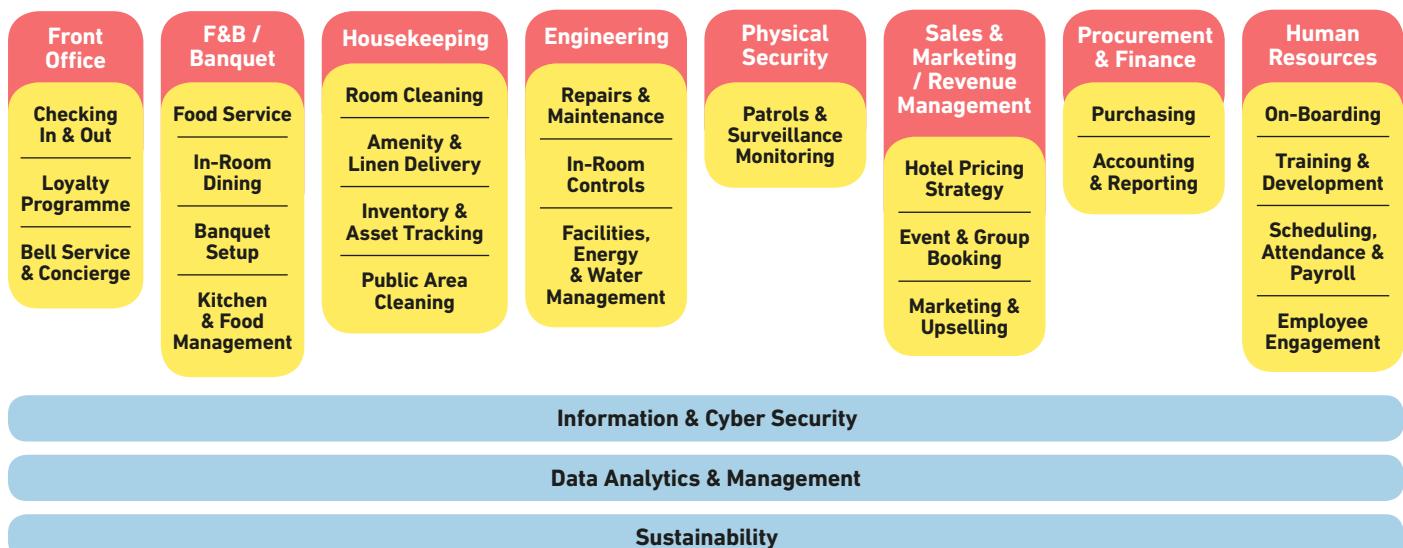
TO BEGIN YOUR SMART HOTEL JOURNEY

AREAS OF OPPORTUNITIES

The 2019 Guide identifies **eight common hotel functions and their respective processes** that can leverage enabling technologies and solutions to unlock a combination of the following objectives:

- Becoming manpower lean
- Eliminating non-value-adding processes and activities
- Driving the top line efficiently and effectively
- Improving environmental sustainability

Common Hotel Functions and Processes



DO YOU KNOW?



The above functions represent typical departments in a hotel. However, hotels can rethink these traditional boundaries and assess opportunities to break them down to unlock smarter and more efficient processes – enabled by technology or job redesign.

For instance:

► The IT department should not be solely responsible for implementing innovation. Several hotels, e.g. **Grand Hyatt Singapore**, **Ritz Carlton Millenia Singapore** and the **AccorHotels Singapore** group have an **innovation team** comprising managers from each function to look at adopting innovation for improving productivity as a whole, within a service perspective.

► **InterContinental Hotels Group** and **Marina Bay Sands Singapore** set up their respective **hotel data and/or analytics** teams that look into collection and analysis of all useful data – from operational analytics, process improvement to understanding customers' needs. They then come up with implementation strategies that can benefit various hotel functions.

► **Copthorne King's Hotel Singapore** **combines bellhop and security roles** to increase lobby workflow and provide job stability for employees.
► **Iyf Funan Singapore** integrates the front office, guest relations and marketing roles into a community manager role, or "**lyfeguard**", to empower employees and optimise the level of service and guest experience provided.

Refer to “**Available Government Support and Toolkit**” on page 55 for more info on resources to guide hotels on job redesign.

GUIDING POINTERS



Humans first, always

In many ways, technology and automation are helping hotels return to their roots as a people-first industry. With technology performing the repetitive, undesirable and low value-adding work, employees can be more efficient and focused on interacting face to face with guests.

On top of driving operational efficiency, do consider if the technology can also achieve employee satisfaction – e.g. *is the solution easy and intuitive to use? Will staff support be readily rendered during the transition?* When employees see value in adopting technology in their daily work, they will stay in the job longer.



Cyber and data security need to be foundational capabilities

Poor digital security and privacy may lead to potential legal and regulatory problems. Guests' trust and confidence in the hotel, and the hotel's reputation, are also largely at risk should there be a security breach.

It is therefore vital for hotels to develop a vision of their desired Smart Hotel that incorporates the above concerns and the hotels' own characteristics. Once a vision is set, a hotel can then achieve it by adopting appropriate structures and technology solutions to identify and address its key cybersecurity and privacy vulnerabilities.



Lastly, there is no one-size-fits-all list of best practices and Smart technologies

Instead, hotels should assess their own areas of gaps and opportunities to create the right framework for success, before adopting technology solutions tailored to each hotel's unique set of challenges and performance metrics.

Hotels can tap readily available resources from STB to assist in the process, such as the **self-diagnostic toolkit** (ready in 2020) that identifies gaps and opportunities for hotels to implement digital solutions and build capabilities. Hotels can also attend the **Tech College** to learn ways to ideate and develop action plans aligned with their transformation vision.



Importance of data in every hotel function

When adopting a solution, hotels should ensure that the new and legacy systems can "talk" to each other in an integrated and automated way. This helps to combine data sources and provide real-time analysis via easy-to-read dashboards. Hoteliers can then process data and make fast and informed decisions without having to rely on "gut" feel.

Also, consider putting in place a strategy that ensures staff from all functions collect data continuously and granularly, and the data is accessible to everyone so that they can analyse the data in ways relevant to their work.



Hotel leaders need to cultivate a collaborative, agile and calculated risk-taking culture within the organisation

In fact, a hotel that encourages its teams to continuously experiment with new ideas and scale up its successes (while allowing some room for failure) is en route to becoming a successful Smart Hotel. Changes are faster, and the hotel will be more responsive to guests and employees' needs, enhancing business outcomes.

Use this guide

This guide provides:



A description of Smart Hotel experiences for each of the eight hotel functions
A business case for each stage, and the corresponding Smart experiences



Information on available technologies to enable Smart Hotel experiences
Capabilities, benefits and considerations of technology implementation



Relevant case studies
Details of project implementation, outcomes and considerations

Refer to "**Available Government Support and Toolkit**" on page 55 for more info.

Note: Information in this guide serves to act as a reference. Uses of technology and examples are non-exhaustive.

1



2



Interviews and focus group discussions with hotel stakeholders representing over 30 hotels and hotel groups in Singapore under local and international brands

Literature and desktop research to gather information and case studies

Hotels' key management leaders and the Singapore Hotel Association

- ▶ To understand business imperatives and considerations in evolving into a Smart Hotel from a back-of-house perspective
- ▶ To ascertain areas of opportunities and operational impact

Hotels' heads of departments & hospitality association representatives

- ▶ To understand what a Smart Hotel means for each hotel function
- ▶ To identify existing operational pain points and areas of opportunities to improve productivity and resource management

Technology professionals working for hotels

- ▶ To identify both technical and non-technical considerations when adopting technology solutions
- ▶ To understand requirements and challenges in selecting and implementing technology solutions in the hotel context.

3



Expert inputs from **Hospitality Technology Next Generation (HTNG)**⁶ on accuracy of content regarding hotel technology

⁶ HTNG is a global non-profit organisation that fosters development of next-generation solutions through collaboration among professional and technology providers of hospitality.

The Smart Hotel Experience



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FRONT OFFICE

BUSINESS CASE

The Front Office (FO) plays a vital role in a hotel, often being the first and last points a guest interacts with during the stay. According to Cornell's Centre for Hospitality Research, guest satisfaction decreases by 47% once check-in takes more than 5 minutes. The FO therefore needs to find ways to provide a seamless experience for guests, leaving them with positive first and last impressions, and converting them into loyal return customers.

AS SUCH, A SMART FO NEEDS TO:

- ✓ Be manpower lean
- ✓ Eliminate activities that do not add value
- ✓ Drive top line efficiently and effectively

ENABLING TECHNOLOGIES



Data Analytics &
Cloud Technology



Internet of Things
(IoT)



Robotics



Robotic Process
Automation (RPA)



Video Analytics



Artificial
Intelligence (AI) &
Machine Learning

CHECKING IN & OUT

THE COMMON EXPERIENCE TODAY

Check-in process

FO staff log onto the property management system (PMS) at the front desk to register all check-in guests one by one, causing a long wait, especially during peak hours.

The FO team does not know exactly when guests will arrive, hence it cannot anticipate the manpower required at different times of the day.

The housekeeping team also does not know which rooms to clean first. If a room is not ready when the guest arrives, FO staff have to call the housekeeping team to clean that room first.

FO staff can check in guests early but cannot issue their room keys when their rooms are not yet ready. When they return, their profiles must be re-opened to verify their details again, before programming the key cards, resulting in twice the amount of time spent on each guest.

Physical check-out

During check-out, FO staff have to manually input the payment amount into the electronic data capture (EDC) terminal to make the credit-card transaction. After the transaction is approved, the staff has to input the EDC arrival code manually into the PMS to end the payment process.

This process is compulsory even if the guest's card details were already provided via online booking.

Express or mobile check-out

When guests drop their key cards in the express check-out box, FO staff manually retrieve the keys and check the rooms out one by one on the PMS. This results in the guests' check-out being reflected in the PMS later than the physical check-out, delaying the room cleaning and causing longer turnaround time.



A SMART HOTEL EXPERIENCE

Once guests enter the lobby, **Smart cameras with facial-recognition capabilities** recognise them from the passport photo submitted during mobile check-in prior to arrival. Guests' **mobile keys are then activated automatically**, allowing them to bypass the FO completely and head up to their rooms.

As guests share their arrival times during mobile check-ins, the FO team anticipates peak periods and rosters staff accordingly. The housekeeping supervisor accesses the arrival timings on the **e-housekeeping app** too and prioritises the cleaning of certain rooms, reducing guests' waiting time.

FO staff check in early guests as normal, giving them a set of non-programmed room keys. Once the room is ready, the PMS will automatically send a notification to the guest **via Robotic Process Automation (RPA)**. They can activate their mobile keys or tap in at a kiosk, bypassing FO staff.

After the guest has confirmed the amount, the FO staff clicks the "confirm" button on the PMS, and the **payment gateway integrated with the PMS** automatically inputs it into the EDC terminal. The PMS is updated automatically with the approval code once the transaction goes through.

Guests who booked via the hotel website already have their credit-card details tokenised and safely stored in the **PCI and PSD2-compliant payment gateway**. FO staff can just settle the check-out payment using the tokenised details without guests having to present their cards again.

When guests check out via mobile app, or dropping key cards into the **express check-out box embedded with RFID reader**, it will detect the room number and check it out via the PMS. The **RPA software** will then automatically update the room status in real time so staff can prepare for the next arrival.

LOYALTY PROGRAMME

THE COMMON EXPERIENCE TODAY

Recognising loyalty members

Due to the lack of integration between the PMS and Customer Relationship Management System (CRMS), FO staff who do not refer to the CRMS at check-in might miss guests' loyalty membership details. Thus, guest relations staff will look through the list of arriving guests every day to identify loyalty members, then add a prompt in the PMS to highlight their status during check-in.

Customised upselling

Based on the limited information FO staff have on guests, they can only upsell generic hotel offerings.

A SMART HOTEL EXPERIENCE

Integrated with the CRMS, the Smart camera with facial-recognition capabilities also helps identify loyalty members and repeat guests when they enter the hotel lobby, alerting FO staff to greet them in a personalised and timely manner.

By recognising the guests, the **Smart CRMS** will also extract their preferences to assist FO staff in conducting targeted upselling, boosting potential revenue. For instance, if the CRMS captures that a guest always ordered alcohol during his past stays, FO staff can ask if he would like to upgrade to a room with club access, where he can enjoy unlimited drinks.

BELL SERVICE & CONCIERGE

THE COMMON EXPERIENCE TODAY

Bell service

A bellhop manually transports luggage to the rooms via the heavy luggage cart after being informed of the room number.

Upon check-out, the bellhop manually collects the suitcases, ties paper tags on them and passes the other half of the tag to the guests for them to present upon retrieval. He then places the suitcases in the storeroom and manually searches for them upon retrieval. The process could result in a long wait during peak hours.

Concierge

The concierge recommends itineraries to guests, but sometimes is unable to provide updated information due to the sudden closure of an attraction or restaurant, leading to dissatisfied guests.

The concierge often has to answer simple and repetitive questions, and is unable to help guests with more demanding or special requests.

A SMART HOTEL EXPERIENCE

A bellhop no longer needs to make countless trips. He just loads the luggage onto an **autonomous cart integrated with the lifts** that will deliver them securely to the rooms.

Upon check-out, guests can store their luggage by activating the **automated baggage storage system** using facial recognition. The system will store the luggage efficiently in the storeroom via robotic arms after security screening.

AI-enabled chat-bots integrated with STB's Tourism Information and Services Hub (TIH) via APIs can provide guests with up-to-date, real-time itineraries, as well as recommendations to enhance their stay. The concierge thus has more time for guests with more complicated queries.

The concierge can also **leverage data collected by the chat-bots** through past guest interactions and its monitoring of social media channels to anticipate potential problems, and customise services accordingly.



DO YOU KNOW?



Launched by STB, the **Tourism Information & Services Hub (TIH)** is a free one-stop B2B platform for tourism businesses to directly connect, access, and share Singapore destination content and travel software services.

The TIH powers the Visit Singapore mobile app, as well as other businesses' digital platforms, helping our tourism businesses achieve greater outreach to global audiences.



Be part of the TIH today!



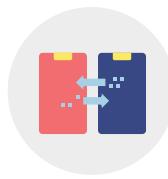
Step 1

Register for a free
TIH account.
You will need your
CorpPass account.



Step 2

List your hotels'
products & offerings
regularly and/or
download relevant
tourism information.



Step 3

Sync directly with the TIH via
Application Programming Interface
(API) to tap real-time tourism
information updates and ready-to-use
travel software services.



What are the features in the TIH?

- ▶ Updated destination content in 11 categories such as F&B, Retail, Tours, Events and Walking Trails, supported in 5 languages (English, Simplified and Traditional Chinese, Japanese and Korean).
- ▶ Attribution-free digital assets e.g. videos and images.
- ▶ Ready-to-use travel software services for your hotel's front-end digital platforms, e.g.:
 - ▷ Enhanced navigation service
 - ▷ Recommendation engine
 - ▷ Smart itinerary planner
 - ▷ Visit Singapore Account, a single digital token that hotels can integrate as a mode of login on your digital platform to gather deeper insights and push personalised recommendations to guests



How does the TIH benefit hotel businesses?

- ▶ Delivers real-time information of your hotel's room rates and products (e.g. events and unique experiences) to a previously untapped audience.
- ▶ Enhances guest satisfaction by creating for them customised maps and precinct guides via the hotel's own digital channels and/or concierges.
- ▶ Boosts productivity by connecting hotel systems directly to the TIH via APIs, e.g.:
 - ▷ Reduces the number of repetitive guest enquiries answered by concierge staff
 - ▷ Removes the need for marketing staff to frequently research and update content across platforms
 - ▷ Provides the sales and marketing team insights into local visitors' preferences

[Click here to refer to the TIH Toolkit for more information](#)

FOOD & BEVERAGE / BANQUET

BUSINESS CASE

Increasingly, travellers are not just looking for a place to stay. They are also willing to spend more on food and beverage (F&B) options, giving hotels opportunities to net extra revenue.⁷ With both F&B and Banquet functions becoming major contributors to a hotel's positioning, hotels should not overlook their ability to provide high-quality food and efficient dining.

HOWEVER, WITH RISING COSTS AND A TIGHT MANPOWER SITUATION, SMART F&B AND BANQUET FUNCTIONS NEED TO:

-  Be manpower lean
-  Automate activities that do not add value
-  Reduce operating costs

ENABLING TECHNOLOGIES



Data Analytics &
Cloud Technology



Internet of Things
(IoT)



Robotics



Robotic Process
Automation (RPA)



Video Analytics

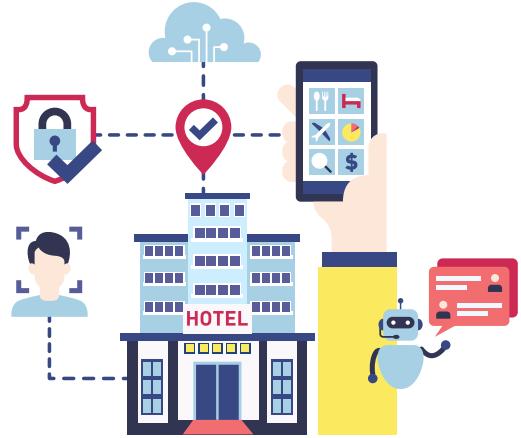


Artificial
Intelligence (AI) &
Machine Learning

⁷ Hospitality Net, "Food and Beverage Boosts Hotel Revenue" (2019) and CBRE Hotels' Americas Research, "Trends in the Hotel Industry" (2017)

THE SMART HOTEL EXPERIENCE

FOOD SERVICE



THE COMMON EXPERIENCE TODAY

Table management

F&B staff log on to different devices, reservation accounts and emails to check and consolidate reservations from various platforms into the hotel's own table management system.

Daily breakfast service is usually hectic, with a large volume of guests and long waiting times as staff have to verify guests' breakfast entitlements against a printed list.

F&B staff have to walk around to search for available tables, flag them for cleaning, then manually indicate that they are ready in the table management system before another staff member brings a guest in.

Ordering

F&B staff are constantly looking out for guests to take orders or assist them. Sometimes, due to a tight manpower situation, guests wait for a long time before being served.

Payment

F&B staff have to reconcile all food orders made into the POS and print a bill for the guest to pay or charge to the room. Staff will then manually tally closing figures at the end of each shift.

A SMART HOTEL EXPERIENCE

F&B staff log on to only one **table management system that is integrated with various dining reservation platforms** to view all reservations and approve the system-suggested table seating arrangement for the next meal service.

F&B staff can detect guests' breakfast entitlements instantly **via facial-recognition cameras** placed at F&B outlet entrances.

The **CRMS, integrated with the cameras**, will help F&B staff recognise and greet loyalty members and repeat guests, customise F&B promotions to entice spending and offer giveaways to enhance their experience.

"Open" tables are viewed in real time through a **mobile table management system integrated with video analytics capabilities**. Smart cameras can identify vacant tables and notify staff to clean them. The camera then identifies an object placed by staff on the clean table and flags it as "open" in the system.

With wireless e-menus, orders can be placed via mobile devices in a timely fashion with fewer errors. The menus can also be **updated in real time** (e.g. depending on availability of ingredients), and **are integrated seamlessly with the kitchen management and Point-Of-Sale (POS) systems**. F&B staff do not need to physically share orders with the kitchen and create a billing invoice in the POS.

Since **all F&B systems are integrated**, the POS will create the bill seamlessly, and instead of taking out their wallets, guests pay via **facial recognition or tap their keys with stored tokenised payment data**.

Staff also do not need to tally closing figures manually as the **integrated payment gateway** will automatically reconcile each transaction (i.e. check consistency between the sales report and payment requests on POS). F&B staff need only manage exceptions.

THE SMART HOTEL EXPERIENCE

IN-ROOM DINING

THE COMMON EXPERIENCE TODAY

Ordering

F&B staff write food orders on paper after receiving a call from the guest, and convey the order to the kitchen verbally. Staff then manually input the bill charges into the POS.

In-room delivery

F&B staff will physically push the in-room dining trolley into the room to deliver the order. However, staff have to check every floor with in-room dining requests, as they will not know when to collect the trays or trolleys afterwards.

A SMART HOTEL EXPERIENCE

Guests place their orders via the **in-room chat-bot integrated with the POS and kitchen management system**, which will send orders and billing directly to the POS and kitchen respectively. Staff will tend to guests' calls only when the chat-bot cannot assist with their requests.

F&B staff will place the order in a **secure autonomous in-room dining robot** for delivery to the rooms. Guests unlock the robot via **facial recognition or their keys** to retrieve the food. The tray, fitted with **Smart IoT sensors**, will automatically notify the robot once placed outside the room for collection.

BANQUET SETUP

THE COMMON EXPERIENCE TODAY

The banquet team manually lifts the heavy and bulky furniture needed (e.g. big round tables, chairs, stage platform) onto a cart and physically pushes the heavy cart back and forth from the storeroom to the function area.

Banquet staff then carry the tables to designated spots according to the floor plan, manually fold each napkin, and set up tableware and glassware on each table. This task is both time consuming and labour intensive.

A SMART HOTEL EXPERIENCE

Banquet staff stack heavy tables and chairs on a **lightweight autonomous cart** to bring them from the storeroom to event venue with little effort.

The setup process becomes easier; staff lift the tables from the cart and place them at a staging spot to set up the tableware, glassware and napkins folded by the **automated napkin-folding machine**. The **autonomous banquet robot** will then lift and move the fully set-up table to its designated spot according to the floor plan. A similar robot moves chairs and other furniture to their designated positions too.

After the event, the same **robot** will move the tables back to the same staging spot, where staff can easily dismantle the setup.

KITCHEN & FOOD MANAGEMENT

THE COMMON EXPERIENCE TODAY

Food inventory management

F&B staff track the inventory of the F&B store by manually counting supplies. When supplies are not monitored properly, there is a risk of running out of certain ingredients or stocks.

Food hygiene and safety

F&B staff conduct daily routine checks on food safety and hygiene by manually recording temperatures of refrigerators and monitoring freshness of ingredients by remembering which supplies were stored first.

Staff check off paper checklists and hand them to supervisors for manual checks before storing them in physical files for future audits. Issues are conveyed verbally for staff to rectify. It is difficult to monitor the status of rectifications and sometimes the information is not shared accurately.

Food preparation

The commis/cook has to handle both food preparation and conduct live cooking of basic dishes like eggs and noodles to serve a long queue of guests, particularly during the hectic breakfast service.

Stewarding

After meal services or banquet events, the steward has to expend much time and effort loading soiled tableware and cutlery into the dishwasher, then unloading and sorting the cleaned ones piece by piece for storage.

Food waste management

Kitchen staff discard a large amount of leftover food and expired ingredients into trash bins without any tracking done.

A SMART HOTEL EXPERIENCE

Smart IoT sensors in the F&B stores can automatically count the quantity of each stock, so staff just need to check the **mobile dashboard** to view the real-time inventory.

When inventory levels are lower than the threshold forecast by the **AI dashboard** after analysing data from the PMS, table management and food waste management systems, **RPA software** will automatically generate purchase orders and prompt supervisors for approval, simplifying the procurement process.

IoT sensors installed in the freezers and kitchen equipment can automatically capture the data and present them on a dashboard. **Smart cameras embedded** in refrigerators digitally tag expiration dates on different food items, helping staff keep track of fresh and expiring items.

F&B staff and supervisors can access all digital checklists via the **cloud-based food safety digital platform on their mobile devices**. All data is uploaded in real time onto the platform so supervisors can monitor performance on the go, alert staff to rectify issues and help minimise overall food wastage.

Food is prepared and cooked alongside **automated food robots**, such as **egg and noodle robots**, easing manpower pressure and shortening guests' waiting time.

Soiled tableware is loaded once into the **Cartesian dishwashing robot equipped with conveyor rollers and robotic arms** that moves soiled tableware from the pre-wash station to the dishwasher, then to the drying area. A **robotic arm** picks up the cleaned cutlery and feeds them into a **sorting machine with video analytics capabilities** that recognises and sorts different types of cutlery for easy storage.

A **bin with Smart AI capability** automatically weighs, detects and records the type and amount of food items discarded. Chefs and F&B managers **integrate and analyse data from the PMS and table management system** such as occupancy rates, number of reservations and covers to tweak their menus, food quantity and types of ingredients to procure, reducing food waste and generating more cost savings.

HOUSEKEEPING

BUSINESS CASE

A hotel's ability to turn over rooms quickly has a direct impact on guest satisfaction and revenue. However, tight manpower challenges and the lack of communication between hotel systems constantly affect work efficiency of the Housekeeping team, making the physically demanding tasks even more laborious and time-consuming.

A SMART HOUSEKEEPING FUNCTION SHOULD:

-  Be manpower lean
-  Be able to automate activities that do not add value

ENABLING TECHNOLOGIES



Data Analytics &
Cloud Technology



Internet of Things
(IoT)



Robotics



Robotic Process
Automation (RPA)

ROOM CLEANING

THE COMMON EXPERIENCE TODAY

Room assignment

The housekeeping supervisor starts the day with a printed list of rooms to be cleaned from the front office (FO). He/she then manually checks a roster and assigns rooms to each attendant by handing him or her a printed schedule.

Each room attendant receives a printed room roster at the start of the shift, and goes from door to door to check which rooms to clean. When rooms are occupied or have the "Do Not Disturb" sign turned on, the attendant will need to return to clean them. The attendant also will not know which rooms have the "Make Up Room" (MUR) sign turned on until they walk by.

When a guest is checking in but the room is not yet cleaned, FO staff will call the housekeeping supervisor, who then checks the printed schedule before assigning someone to clean the room.

Room cleaning

The room attendant pushes the heavy housekeeping cart and moves a bulky vacuum cleaner from room to room.

The attendant also takes note of guests' requests and receives instructions from supervisors (e.g. changing of pillow type) on paper. As messages are shared manually, they are untraceable; hence, there is a risk of displeasing guests and making staff run multiple trips.

While cleaning, the attendant bends down to vacuum the floor and under the bed, lifts heavy beds to change linens, and wipes bathroom amenities and floors. Staff constantly suffer back and knee problems from the laborious work.

Minibar tracking

The room attendant realises that there are some consumed items from the minibar and calls the F&B team to bill those items to the room before replenishing.

Reporting of room status

After cleaning a room, the room attendant calls the supervisor or keys a code into the in-room telephone to record that the room was cleaned.

Tracking performance

Using just pen and paper, the supervisor is unable to track and analyse performance and the time taken by the room attendants to complete their tasks.



A SMART HOTEL EXPERIENCE

The housekeeping supervisor logs onto the **cloud-based e-housekeeping app integrated with the PMS and HR systems** to review the list of rooms auto-assigned to each attendant that already took into consideration the priority rooms, special requests and each attendant's availability and performance.

Room attendants log into the **e-housekeeping app via mobile device** to view their assigned rooms. **In-room controls, sensors and the PMS integrated with the e-housekeeping app** allow them to track real-time room occupancy status on the go. The cleaning of checked-out rooms and those with the MUR sign turned on can be prioritised accordingly.

Similarly, the FO staff will highlight rooms that require urgent cleaning in the PMS. The **e-housekeeping app** will automatically assign these rooms to the next available attendant and notify him or her instantly.

An **autonomous housekeeping cart** follows the attendant from room to room, while a **vacuum robot** cleans the floor on its own.

To start the room cleaning, the attendant logs onto the **e-housekeeping mobile app**, which automatically updates the PMS of its "closed room" status. The attendant anticipates guests' needs as special instructions and preferences captured in the CRMS are also highlighted in the app.

Through **IoT sensors**, **Smart beds** sense staff and automatically rise to a comfortable height to assist in bed making. The attendant sprays a **Smart chemical** over the bathroom floor, bathtub and toilet, which hardens to a thin film that is peeled off to remove stains, making cleaning less tedious.

The minibar is installed with **IoT sensors**, and alerts the FO and F&B teams of the items consumed and bills them to the guest. The **e-housekeeping app** will also inform the room attendant of the items that require replenishing in each room, saving them time from checking.

After cleaning a room, the attendant updates the room status on the **mobile app**, which will automatically update the PMS in real time. This allows the FO staff to check a guest in to the clean room quickly.

The analytics shown on the **e-housekeeping app's dashboard** help supervisors better monitor the performance of each room attendant, and better plan housekeeping operations.

AMENITY & LINEN DELIVERY

THE COMMON EXPERIENCE TODAY

Besides cleaning rooms, room attendants need to bring amenities up whenever guests request for them.

After room cleaning on each floor, the room attendant has to physically transport dirty linen to the linen room for laundry collection, making multiple trips up and down during a shift.

The linen attendant manually counts the soiled linen to be sent for laundry, and the clean ones that arrive, to ensure that they are accounted for.

A SMART HOTEL EXPERIENCE

Upon receiving guest requests made via chat-bots, any housekeeping staff can help place the requested items into the **autonomous delivery robots** for room delivery.

The attendant places the dirty linen at a collection point on each floor, where an **autonomous linen robotic cart** travelling from floor to floor will collect the soiled linen.

As all linens are **RFID-tagged**, the linen attendant can count a whole cart of linen quickly with just a hand-held scanner. Any discrepancies will be flagged for follow-up action.

INVENTORY & ASSET TRACKING

THE COMMON EXPERIENCE TODAY

Stock taking

Room attendants have to conduct regular stock taking of the inventories in the floor pantries and main housekeeping store. As counting and tracking are done manually, stock may run out when records are not accurately updated on time. Staff have to manually send in orders to procure more items.

Asset tracking

The housekeeping team manually monitors where assets such as rollaway beds, hairdryers, coffee machines etc. are located, noting down the information and/or searching for the item when requested.

Uniform return and collection

The uniform attendant manually searches for the clean uniforms of all staff members; this sometimes results in a long wait if many shifts start at the same time. Staff also have to ensure that they collect a clean uniform before the uniform attendant ends his/her shift.

A SMART HOTEL EXPERIENCE

Inventories are tracked in real time with the installation of **IoT Smart sensors** in the housekeeping floor pantries and main store. When they go below a threshold pre-set by the hotel, a **RPA robot** automatically notifies staff to restock the floor pantries and/or send a procurement notice.

All relevant assets are tagged with **Bluetooth Low Energy (BLE) tags** that allow their locations to be tracked in real time. The housekeeping team no longer has to search for them manually.

With the **RFID uniform conveyor system**, the attendant no longer has to search for uniforms. Staff members just tap their RFID staff passes to retrieve their uniforms at any time of the day. The attendant just hangs the uniforms on the conveyor's designated spots and conducts troubleshooting.

PUBLIC AREA CLEANING

THE COMMON EXPERIENCE TODAY

Housekeeping staff report the cleaning status of various areas on paper. Supervisors will not be able to track the status until the end of the shift.

The vacuuming and mopping of public areas such as the lobby and public toilets are tedious and unproductive.

Housekeeping staff regularly conduct checks on toilets in public areas to ensure sufficient toilet supplies, and replenish them if necessary. The item may not be replenished soon enough, which might result in lower guest satisfaction.

A SMART HOTEL EXPERIENCE

Housekeeping staff indicate the cleaning status of each area in the **e-housekeeping app** when they begin and end their duties, allowing supervisors to keep track of work completed.

Staff activate the **autonomous vacuum robot** to clean public areas, leaving staff with sufficient time for more complex duties like the wiping of glass windows, etc.

Smart IoT sensors on soap and toilet paper dispensers will send urgent mobile notifications to housekeeping staff to top up supplies when they run low.

ENGINEERING

BUSINESS CASE

The hotel's Engineering team is critical to its functionality and ability to remain in business. It has to ensure that building facilities and critical equipment such as the heating, ventilation and air-conditioning (HVAC) system are functioning smoothly, while tending to all repair assignments swiftly.

However, the team is often overburdened with daily manual tasks, and is constantly under pressure to complete assignments quickly to maintain guest satisfaction. With an increased focus on sustainability, the Engineering team is also tasked to find ways to reduce the hotel's energy and water consumption, minimise the carbon footprint, and save on operating costs.

A SMART ENGINEERING TEAM SHOULD:

- ✓ Eliminate activities that do not add value
- ✓ Help the hotel become more sustainable

ENABLING TECHNOLOGIES



Data Analytics &
Cloud Technology



Internet of Things
(IoT)



Artificial
Intelligence (AI) &
Machine Learning

REPAIRS & MAINTENANCE



THE COMMON EXPERIENCE TODAY

Every day, each engineering staff receives a long checklist on paper of equipment that require monitoring. Throughout the day, the team will receive notifications of repair and maintenance requests via phone or email. The supervisor will then check an offline roster and manually assign staff to fix the issues.

Staff also have to walk around the property to record meter readings for water, electricity, temperatures and battery life on paper.

When there is an issue, staff will make repeated trips to inspect the problematic area before requesting the help of colleagues or bringing in the correct tools, potentially taking a longer time to solve the problem and lowering guest satisfaction.

A SMART HOTEL EXPERIENCE

Engineering staff log onto the **mobile cloud-based job dispatch system** to view their individualised task list for the day. Throughout the day, they receive alerts via the mobile app on defects and repair requests made by guests via chat-bots or staff members, and can monitor issues and prioritise tasks efficiently.

With **Smart IoT sensors embedded throughout the property**, staff can now monitor and analyse real-time readings of different systems, such as security, fire safety, power, HVAC, kitchen and other critical equipment via a **single dashboard** on the go. They can pinpoint issues and prepare necessary tools to rectify them, minimising wasted trips.

When abnormalities arise, the **engineering job dispatch system integrated with the HR system** automatically assigns the urgent task to the most qualified staff. The team and supervisors can monitor the real-time status of every task through the app, so no tasks will fall through the cracks.

IN-ROOM CONTROLS

THE COMMON EXPERIENCE TODAY

The lack of real-time data exchanges and analytics from various hotel systems and teams makes it challenging for the engineering team to implement immediate improvements to reduce energy and water consumption.

Also, bad smell or mould in the guestrooms typically happens when guests set the air-conditioning away from the optimal temperature for a prolonged period, resulting in mould and mildew growth over time. However, the team cannot see any potential problem areas, especially in rooms, until a complaint is received.

A SMART HOTEL EXPERIENCE

Through a **single AI-enabled dashboard integrated with IoT sensors, in-room controls and HVAC systems**, engineering staff can now easily:

- ▶ Pinpoint problem areas instantly when a sudden spike in energy consumption is observed;
- ▶ Remotely adjust the temperature when a drop in the quality of in-room conditions is detected;
- ▶ Conduct preventive maintenance according to the actionable insights generated by the dashboard, reducing breakdowns and costs.

The **AI-enabled dashboard** will continuously learn how building systems work, analyse individual employee performance, the number of times an item has been serviced and other factors (e.g. weather, time of the year, types of rooms) to optimise operations and energy consumption.

FACILITIES, ENERGY & WATER MANAGEMENT

THE COMMON EXPERIENCE TODAY

The engineering team conducts the following tasks manually and reactively on a daily basis, resulting in unnecessary energy and water wastage:

In-room management

Guests might leave their room with the lights and air-conditioning on and/or the balcony door open, wasting unnecessary energy.

Lighting management

During bad weather or at night, the engineering team manually turns on the lights in the hotel's public areas (e.g. driveways, outdoor corridors) to ensure they are well-lit.

Water management

The engineering team will not be aware of leaks until they are reported, resulting in wasted water and resources.

Swimming pool management

The engineering team has to manually check and record the pool's water quality every few hours and dose the pool with the required chemicals when it is not on par.

A SMART HOTEL EXPERIENCE

The **integrated Smart building and facilities management system** can assist the engineering team to develop data-backed strategies that proactively reduce energy and water consumption, environmental impact and operating costs:

In-room management

In-room **IoT sensors** detect when a room is unoccupied after some time, or the balcony door is open, and automatically switch the in-room systems to energy-saving mode.

Lighting management

IoT sensors sense the level of ambient light and automatically turn lights on/off at a pre-set level. The lighting management system also regulates energy consumption and alerts the engineering team should a bulb fail.

Water management

Through the **Smart water management system**, the engineering team can monitor and control the water flow throughout the hotel, generating savings while not compromising on guest experience.

Swimming pool management

Embedded pool sensors capture and send data to the system dashboard so the engineering team need not travel to the pool to track water quality. If water quality does not meet the pre-set level, an integrated pump will automatically dose the pool with the required chemicals.

PHYSICAL SECURITY

BUSINESS CASE

Safety and security is always the top service priority. Hotel guests have an understanding that they and their belongings will be safe and secure during their stay.

The Physical Security team's goal is to provide protection to guests discreetly, without interrupting day-to-day operations and activities. Yet, inefficient workflows and manual administrative tasks hinder the team in reacting promptly to any potential crisis.

A SMART PHYSICAL SECURITY FUNCTION SHOULD:

-  Be manpower lean
-  Eliminate activities that do not add value

ENABLING TECHNOLOGIES



Data Analytics &
Cloud Technology



Internet of Things
(IoT)



Video Analytics



Artificial
Intelligence (AI) &
Machine Learning

PATROLS & SURVEILLANCE MONITORING

THE COMMON EXPERIENCE TODAY

The bulk of a security staff's day includes patrolling the indoor and outdoor premises to identify any security anomalies. The security team also has to consistently roster manpower to monitor a large amount of security footage.

Staff report a suspicious incident, person or object identified during patrols or in footage via walkie-talkie to their supervisor, who will assign the nearest staff member to investigate. There will be a time lag between identifying the concern and acting on it.

On days when there are multiple concurrent events, the hotel experiences a high volume of guests. Security staff are expected to maintain order and keep out suspicious people, which is challenging given the different groups and difficulty of spotting suspicious behaviour.

At the end of each shift, staff fill out a report in writing and/or email to flag and record areas that need extra attention by the next shift. However, these administrative processes are mundane, and some areas might risk falling through the cracks, posing security risks.



A SMART HOTEL EXPERIENCE

Intelligent video surveillance technology helps aggregate and analyse data captured from **Smart cameras and IoT sensors** installed around the hotel, and highlights suspicious behaviour to the security staff via notifications on the **mobile job dispatch app**, allowing them to act swiftly on the alert.

With **integration with locksets and IoT sensors**, the system can also help the team stop crime before it happens, without constant monitoring of security footage. For instance, if suspicious activity is detected near the luggage storage room, the system can automatically lock the door before a theft occurs, and concurrently notify the security team.

The **intelligent video surveillance** can accurately count the number of people entering, leaving or remaining within the premises to prevent overcrowding, alert security staff when unauthorised people cross certain boundaries, and identify suspicious people and behaviours via **facial-recognition analytics**.

The system's **counting and AI capabilities** can help supervisors forecast the volume of guests present during similar future periods or scenarios, to better plan crowd-control measures and scheduling of security and operations staff.

Through the **mobile job dispatch app**, security staff can:

- ▶ Highlight security concerns by taking photos via a mobile device (e.g. of a suspicious item or person) and quickly sending them to the rest of the team and other departments
- ▶ Log in their daily activities and incidents via simply clicking buttons on pre-set digital forms
- ▶ Tag colleagues on the next shift over areas to follow up on, reducing security risks from human error

SALES & MARKETING / REVENUE MANAGEMENT

BUSINESS CASE

In the ever-competitive hotel industry, sales and marketing tactics have changed dramatically in recent years, while revenue management has become more important. When competition may literally be right next door, the pressure is always on to get room rates right – from both a guest and revenue perspective.

Hoteliers need to proactively develop an effective pricing and distribution strategy to maximise revenue. Tracking and analysing data is now a necessity to help hotels develop successful sales strategies, customise marketing tactics, and discover any unrecognised revenue opportunities. It is now nearly impossible to do this effectively, and error free, without the adoption of technology and automation.

SMART SALES, MARKETING AND REVENUE MANAGEMENT FUNCTIONS SHOULD BE ABLE TO:

-  Eliminate activities that do not add value
-  Drive top line efficiently and effectively

ENABLING TECHNOLOGIES



Data Analytics &
Cloud Technology



Internet of Things
(IoT)



Robotic Process
Automation (RPA)



Artificial
Intelligence (AI) &
Machine Learning

HOTEL PRICING STRATEGY



THE COMMON EXPERIENCE TODAY

To generate optimal room pricings, the revenue manager manually collects and integrates a huge volume of data from multiple silo systems (e.g. past room rates for each category during various periods from respective channels in different markets), then creates macros to run calculations on spreadsheets.

However, this pricing is based on past data and legacy-set rules and cannot take into consideration real-time competitor pricings nor tourism insights.

The revenue manager has to constantly and manually check the rates across all online travel agents (OTAs) and distribution platforms to note rate-parity issues, before logging on to all platforms one by one to update rate and inventory information. This tedious process is prone to human error, which can result in revenue loss.

As the rates and inventories are not updated in real time, prices presented on some channels may be lower than desired, or rooms presented as available may have already been booked.

Every day, the revenue team has to check a large excel sheet of room blocks updated by the sales team, and manually update all the room types and their statuses (open or close) for the next few months in the PMS.

To manage revenue strategies, the revenue team has to constantly check and analyse multiple excel spreadsheets, reports or systems for information such as updated occupancy, room rates, and competitor rates. Little time is left for the team to generate insights for other hotel departments.

A SMART HOTEL EXPERIENCE

Using an **AI-powered revenue management system (RMS)** with **analytics capabilities**, and integrating it with the **PMS**, **Central Reservation System (CRS)**, **rate shopping and channel manager solution via APIs**, large volumes of data can be automatically consolidated via **RPA** without having to manually pull reports from the PMS and relevant systems.

The RMS, integrated with the STB's Singapore Tourism Analytics Network (Stan) for Tourism Industry via API, can also conduct two-way data exchanges, leveraging collective tourism industry knowledge on visitor arrivals, travel behaviour, market insights, hotel performances and more.

The **AI-powered RMS with machine learning capabilities** will combine all these data and develop algorithms, and become more sophisticated over time, to forecast real-time optimal pricing for the revenue manager to act on, maximising occupancy and profits.

RPA software can help the revenue manager automatically check the rates across all distribution channels and alert him/her on the anomalies, saving time and eliminating double booking and rate-parity issues.

By adopting a channel manager solution that is integrated with the PMS, CRS and RMS, it will seamlessly and simultaneously update all channels from one central point with live optimal rates (drawn from RMS) and accurate inventory availability (drawn from PMS).

The **RPA software** can automate this process by picking out the specific dates, room types, conditions and restrictions from information provided by the sales team and updating these fields automatically in the PMS. It can even conduct auto cross checks, increasing efficiency and accuracy.

By **integrating the cloud-based RMS with Smart chat-bots**, the revenue and other hotel teams can access revenue data and insights anywhere, at any time, by asking the chat-bots.

The revenue team now has time to focus on larger strategic objectives and work with other teams to generate more revenue:

- ▶ The sales & marketing team can access the RMS and utilise the forecast insights to plan its marketing campaigns and determine how aggressive hotel promotions should be.
- ▶ Operations teams e.g. housekeeping can also use the insights to increase or decrease staffing based on projected occupancy.

EVENT AND GROUP BOOKING

THE COMMON EXPERIENCE TODAY

Event sales booking & management

Sales staff manage leads and enquiries via email. There is no formal structure in place for proposals, site visits and follow-ups.

Staff also manually put together proposals, event diagrams, and contract documents for clients using Microsoft Office.

As all the information is stored in the staff's email, it is difficult for another team member to take over when he/she is not in the office, thus risking the lack of continuity to secure the business.

Upon successful client acquisition, the sales staff creates and dispatches a hard copy of the Banquet Event Order (BEO) to all relevant departments. However, when there are changes to the event request, staff have to manually make amendments and reprint the BEO, then inform the various departments via phone or email.

Group sales and bookings

For bookings by corporate and MICE groups, sales staff send the group organiser a rooming list and/or reservation form via a spreadsheet. The client will then collect the guests' information (e.g. arrival and departure timings), and input them into the spreadsheet before emailing it to the sales staff. Staff then input the information collected on the spreadsheet into the PMS piece by piece.

This process is time consuming, and the many rounds of email and manual updates into the system are prone to many errors.

A SMART HOTEL EXPERIENCE

Many tasks can be automated with a **cloud-based Sales & Event Management system** that provides simplified processes to allow the sales team to manage client enquiries and relations effectively and secure more sales.

Staff can easily complete daily tasks on the go:

- ▶ Log onto the system to view his/her respective assigned leads and the scheduled tasks to follow up on for each lead
- ▶ Tag a colleague to follow up when out of office, as all data is captured in the same system, ensuring continuity
- ▶ Using RPA, set automated yet personalised follow-up emails for each stage in the sales process and automatically stop sending reminders once the client replies
- ▶ Easily generate e-Proposals and event space diagramming via a click-and-drag function to respond to each lead's Request for Proposals (RFP) quickly
- ▶ Track individuals and the team's ongoing performance metrics in real time via a single dashboard
- ▶ Quickly generate customised BEOs based on the details captured via the RFP and negotiation stage. Relevant departments will be notified on any changes to the BEO in real time
- ▶ All departments will have access to the finalised BEOs via their respective integrated apps (e.g. housekeeping, PMS) without having to manually receive a hard copy of the BEO

Sales staff just need to create the room block for the corporate or MICE group in the **cloud-based Group Room Management system integrated with the PMS and Sales & Event Management system**, and share the booking link with the event planner or corporate client within minutes.

Attendees will input their own details onto the booking site and communicate directly with the hotel's PMS. Sales staff can now spend more time connecting with guests and clients, and upsell to them on a more personalised level.

MARKETING & UPSELLING

THE COMMON EXPERIENCE TODAY

Location-based and targeted marketing

Once the guest is in the hotel, the marketing team uses printed marketing collaterals and/or digital signage placed in the hotel to promote hotel F&B and spa packages to increase revenue from each guest.



The marketing team is unaware of guests' social media activities during their hotel stay, missing opportunities to engage them in real time to either elevate a good experience or conduct prompt service recovery.

If the guest shares their experience over social media without tagging or mentioning the hotel property, the marketing team will have no idea.

Every day, marketing staff have to manually monitor and react to potential customers' queries and guest reviews on various platforms and channels. Any delay in response time to queries or poor reviews can affect the hotel's reputation.

Marketing staff also have to look through guest reviews of competitors for qualitative analysis and reporting, which is very time consuming and not in real time.

A SMART HOTEL EXPERIENCE

Beacons will sense the location of guests and push contextually relevant promotions to their mobile devices, enticing them to make purchases. For instance, hotels can offer a special beverage discount to a guest already in a bar; or promote a healthy breakfast menu for a guest working out at the gym in the morning.



Smart cameras with facial-recognition capabilities integrated with the CRMS, placed around the hotel, can also assist staff from relevant departments like FO, F&B, Spa & Wellness and the hotel pool etc. to recognise loyalty members and repeated guests, and customise promotions to concurrently upsell and enhance guest experiences.



A **location-based marketing platform** unlocks geosocial data and culs information from social media platforms such as Twitter, Instagram and WeChat to discover influencers and guests' social insights, so that the marketing and operations team can offer assistance or personalised packages to guests. This allows greater guest engagement, increasing satisfaction and hotel revenue.



The **Smart cloud-based online reputation management system** offers automatic real-time reporting of guest sentiments, reputation monitoring, and guest satisfaction surveys, assisting the team to analyse the reports vis-à-vis competition.

Marketing staff can also utilise **RPA software** to automatically contact the respective teams or colleagues mentioned in reviews, to either compliment them or investigate and rectify any situation for swift service recovery.

PROCUREMENT & FINANCE

BUSINESS CASE

Procurement occupies a place of importance in a hotel. It not only supplies the hotel efficiently, but also produces value through the optimal quality of goods and services as a function of customer service and sustainability, at the lowest possible cost.

As a hotel provides 24/7 service, floods of transactions are recorded daily. Every trade, from purchasing a drink at the hotel bar to reserving a room online, results in a sale for the company, which ultimately requires validation checks by the Finance and Accounting team.

Many processes handled by the Procurement and Finance teams are still done manually and time-consuming, and thus prone to errors, which could be detrimental to a hotel's reputation. The teams need automated solutions that can enhance real-time visibility, control, and efficiency across their processes.

SMART PROCUREMENT & FINANCE FUNCTIONS SHOULD:

-  Be able to automate activities that do not add value
-  Drive top line efficiently and effectively

ENABLING TECHNOLOGIES



Data Analytics &
Cloud Technology



Robotic Process
Automation (RPA)



Artificial
Intelligence (AI) &
Machine Learning

PURCHASING

THE COMMON EXPERIENCE TODAY

Purchase requests can sometimes be stuck at the approval stage by management. Even after approval, the team has to log into the system to manually issue purchase orders (POs).

The team also has to manually match paper invoices and chase the finance team to process payment, causing a lag time and potential errors.

The procurement team has to pull out hard copies or saved documents of past purchases, supplier quotes, contracts and order histories to produce a report on actual historical expenses.

These documents are usually stored in an unstructured manner in physical files, making it difficult for the team to keep track.

The procurement team and management are unable to have an overview of the overall procurement cycle. Since the manual process is very prone to errors, huge bottlenecks may occur, which can break up the process flow and hinder purchasing efforts, resulting in delays and unhappy vendors and customers.



A SMART HOTEL EXPERIENCE

Automating purchase order processing with fluid forms will help enable quick placing and tracking of orders, removing redundant processes and cutting down time in the ordering cycle.

Management can approve requests and invoices on the go using the **cloud-based procurement solution** that automatically generates POs after approval via **pre-set RPA rules**. Incoming invoices can be automatically sorted and matched with existing invoices so they are processed quickly.

By deploying an **automated procurement system with pre-set RPA rules**, the team now has a consolidated view of historical and real-time expenses, as the system automatically pulls data from documents saved in a **central cloud-based repository**. This also means that all contracts can be accessed easily while on the go.

It can now streamline spending management, identifying gaps, reducing costs, and making well-informed decisions when making new purchases.

Through real-time updates of the overall procurement cycle via the **online dashboards**, the procurement team is now empowered to do more strategic work. The entire process is now transparent, reducing the possibility of corruption and helping the team manage budgets more effectively.

ACCOUNTING & REPORTING

THE COMMON EXPERIENCE TODAY

Financial reconciliation

The finance team spends many hours reconciling bank deposits and credit-card transactions with data from various hotel's POS, payment gateway and other third-party data systems, and recording them on spreadsheets.

The team also has to download transaction reports from banks, payment gateways etc., and validate the data across various spreadsheets.

During audit periods, the finance team has to spend a lot of time chasing down details and aggregating data to answer audit questions and clarification requests.

A SMART HOTEL EXPERIENCE

With the adoption of a **cloud-based automated reconciliation system integrated with the various POS and payment gateways via APIs**, the finance team does not need to conduct manual reconciliation. Through **pre-set RPA rules**, the system will pull data from each source and reconcile the transactions automatically. It will then identify data anomalies and notify finance staff to resolve the situation in real time.

The **cloud-based dashboard** also increases the finance team's real-time visibility of accounts, eliminating the need for stressful month-end closing of accounts. With **AI and machine learning algorithms** applied, the system will be trained to rapidly consume historical data, and accurately classify and predict causes of non-compliance.

Auditors can be given direct access to the **cloud-based automated system** to pull whatever data required, saving the finance team time from searching for and aggregating data. The **analytics dashboards** also allow both the finance team and/or auditors to easily produce reports for their reporting needs.

HUMAN RESOURCES

BUSINESS CASE

Due to tight manpower and high turnover rates, Human Resources (HR) teams in the hotel industry may struggle to find suitable candidates (especially for operational positions), keep current employees satisfied and retain high-performing ones, among other challenges.

Hotel HR departments must therefore battle these manpower trends, while balancing their responsibilities, by relying on tools and technology to help them source for new hires in a more productive manner, as well as retaining employees by giving them ample career development opportunities and more.

A SMART HUMAN RESOURCES FUNCTION SHOULD BE ABLE TO:

- ✓ Eliminate activities that do not add value

ENABLING TECHNOLOGIES



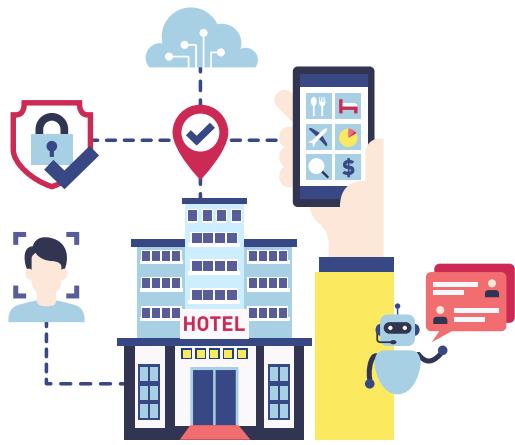
Data Analytics &
Cloud Technology



Robotic Process
Automation (RPA)



Artificial
Intelligence (AI) &
Machine Learning



THE SMART HOTEL EXPERIENCE

ON-BOARDING

THE COMMON EXPERIENCE TODAY

The HR team plans and conducts on-boarding training sessions to keep new hires up to speed with job processes and responsibilities. However, these training sessions might not be conducted swiftly as they are dependent on work schedules, manpower constraints and trainer availability.

Due to high turnover rates, HR has to conduct these training sessions frequently, making it a daunting and mundane task.

A SMART HOTEL EXPERIENCE

By adopting an **automated HR system integrated with a cloud-based learning management system, RPA software** can automate the setup of the online training. Employees just need to log on via a mobile device to view the relevant courses and their respective deadlines.

The **cloud-based dashboard** is also an easy way to monitor the real-time status of all ongoing training sessions, and it can notify supervisors of any non-compliance by staff.

TRAINING & DEVELOPMENT

THE COMMON EXPERIENCE TODAY

Typically, the heads of department (HODs) will work with HR to identify each employee's training needs. HR then seeks out the employee in the HR system, confirm if he/she can go for training, and consults the work roster to schedule training sessions. However, it is typically challenging to schedule the right time due to potential manpower clashes (e.g. if another staff is on leave).

As employees' skill sets and courses attended are recorded manually or in a basic digital form, those eligible for promotion are not automatically flagged, and will need to be first identified by their supervisors. This may affect staff's career progression, and contribute to their disenchantment.

A SMART HOTEL EXPERIENCE

The **cloud-based HR system embedded with AI and machine-learning algorithms** can assist HR, HODs and employees in personalising each individual's learning pathways by identifying relevant training needs based on their years of experience, job requirements and skill sets.

HODs and HR just need to approve the **learning programmes recommended by the AI system**, which will then automatically schedule the courses for each employee, taking into consideration the team's **forecast work schedules**.

These records will be **tracked and analysed by the system, integrating other HR data such as daily attendance rate, overtime hours and guest satisfaction survey** to accurately assist HODs and HR in their assessment of potential candidates for promotion.

SCHEDULING, ATTENDANCE & PAYROLL

THE COMMON EXPERIENCE TODAY

Manpower scheduling

Staff are rostered via a static attendance system, which allocates a fixed amount of manpower for each function, regardless of demand.

Hence, when demand fluctuates or when manpower is down due to leave-taking, HR and HODs have to reshuffle the rostering manually, taking full-timers as well as part-timers into consideration. Higher labour costs may be incurred if the scheduling is not done effectively.

Attendance and payroll validations

HR staff regularly process attendance time checks, reimbursement claims and payroll processing validations manually or through a payroll system that is not integrated with the rest of the hotel systems.

A SMART HOTEL EXPERIENCE

By implementing an **automated manpower scheduling system that can exchange data with the PMS, HR system, e-housekeeping and other job dispatch systems used by operations teams**, the staff rostering process is now dynamic and automated based on the skill sets of individual staff and predicted manpower demand across different functions.

If there is any last-minute unavailability of staff, a new roster that has already considered both demand and staff changes can be **auto-generated with the click of a button** by HR or the HODs.

By determining the required tasks, specific manpower and duration required, staff can be cross-deployed across hotel functions based on their skill sets, departmental budgets and other priority settings (e.g. full-timers before part-timers, location).

The system will also analyse the manpower-scheduling pattern and notify HR on the skill sets that are currently lacking among the existing manpower. HR can then quickly activate part-timers to fill the gap.

Using **RPA software**, the following processes are completely automated:

- ▶ Validation of paycheque amounts and reimbursement details to avoid inaccurate submissions and delays
- ▶ Validation of employees' time records by automatically cross-checking data (e.g. absentee reports against time logged into the hotel system)

HR will be notified in real time only when the information is missing or inconsistent.

EMPLOYEE ENGAGEMENT

THE COMMON EXPERIENCE TODAY

As the HR team spends hours a week answering a vast number of questions from employees – from clarifications on the dress-code policy to queries on days off – sometimes the wait for an answer is long.

In addition, due to high turnover, HR staff have to answer the same mundane questions repeatedly.

A SMART HOTEL EXPERIENCE

By adopting a **HR chat-bot or digital assistant integrated with other HR systems (e.g. e-leave, payroll)**, employees can get immediate replies from the bot on their mobile app, even outside of working hours. The chat-bot just needs to be “trained” by inputting it with frequently asked questions, and it can answer them in the future.

Through **AI and machine learning**, the **chat-bot** can also anticipate employees' queries and trigger suggested actions (e.g. offer to apply for leave when asking about balance leave days), boosting staff engagement and convenience.

Enabling Technologies & Case Studies

The scenarios described in the previous section are not far-fetched. Solutions are already available to streamline your hotel's work processes to help save significant costs, boost revenue growth, become more environmentally sustainable, and increase guest satisfaction.

This section covers key enabling technologies to realise the Smart Hotel experience – not just for your guests, but also your own associates and managers – along with case studies to show how various organisations have taken their operations to the next level by adopting technology.



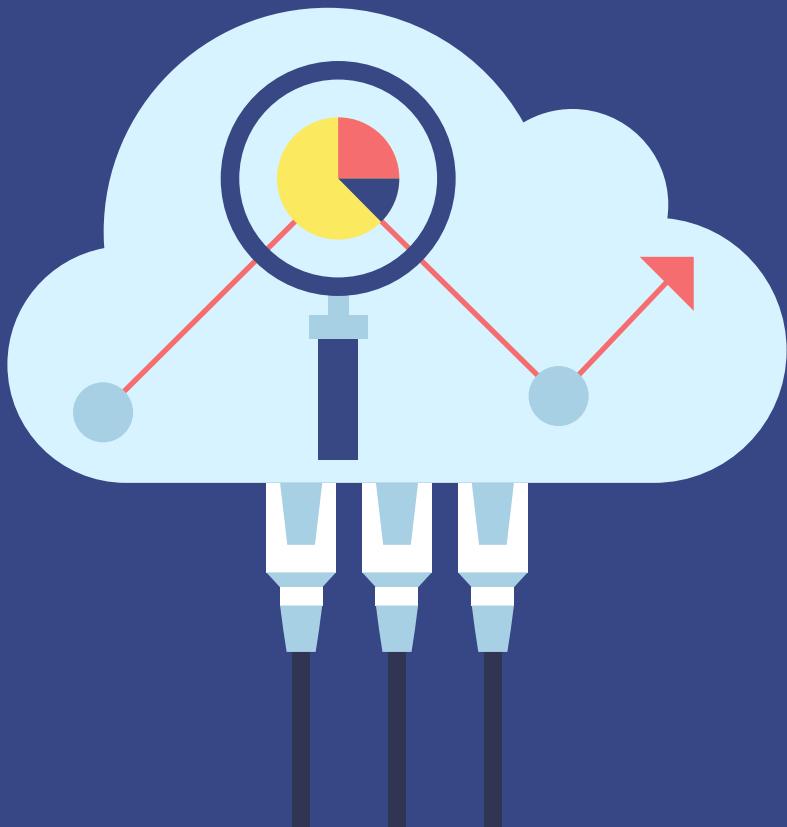
- p.34 Data Analytics & Cloud Technology**
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DATA ANALYTICS & CLOUD TECHNOLOGY

WHAT THIS TECHNOLOGY IS

In the context of the hospitality industry, data constitutes facts like reservations, guest preferences, competitor pricings, energy consumption, employees' details and more. **Data Analytics** platforms assist by pulling and synthesising data from multiple sources, helping hoteliers gain insights and make accurate predictions. **Cloud Computing** essentially is the ability to host software platforms and services from a remote location (aka the "cloud"), allowing hotels to access these solutions anywhere, any time – as long as there is internet access.

With rapid growth in data, hotels need an adequate environment for managing data processes and analytics platforms, which are enabled by cloud services. Both technologies complement each other to work towards providing better value and performance for hotels.



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HOW CAN THIS TECHNOLOGY BE USED AND WHAT ARE ITS BENEFITS?

FUNCTION	EXAMPLES OF USES	BENEFITS
Front Office	<ul style="list-style-type: none"> ▶ Conduct hotel check-ins anywhere in the hotel, on any mobile device through the cloud-based PMS ▶ Understand and anticipate guests' needs via a data dashboard that analyses past questions asked and guest interactions made through chat-bots 	<ul style="list-style-type: none"> ▶ Analysis of high volumes of data can be done in real time with greater accuracy ▶ Staff can develop data-backed strategies to maximise productivity, guest satisfaction and profitability
F&B / Banquet	<ul style="list-style-type: none"> ▶ Assist staff in recording guests' preferences via cloud-based job dispatch mobile apps integrated with CRMS, so they can personalise their services and conduct targeted upselling 	<ul style="list-style-type: none"> ▶ Software platforms and data analytic dashboards are accessible anywhere via mobile, as long as there is internet access
Housekeeping		
Engineering	<ul style="list-style-type: none"> ▶ Optimise housekeeping and maintenance operations with real-time updates of room status in the e-housekeeping and job dispatch app integrated with cloud-based PMS 	<ul style="list-style-type: none"> ▶ With constant access, staff and supervisors no longer need to work behind their workstations, and can focus on enhancing guest and staff engagement
Physical Security	<ul style="list-style-type: none"> ▶ Report security concerns while on the go, allowing for quick dispatch of staff via mobile app 	<ul style="list-style-type: none"> ▶ Easier for hotel systems to connect and integrate with each other via APIs
Sales & Marketing / Revenue Management	<ul style="list-style-type: none"> ▶ Access details on crucial leads via the cloud-based sales and events management platform when engaging corporate clients externally ▶ Analyse internal and external data automatically to optimise room inventory and pricings when cloud-based PMS is integrated with CRS, RMS, STB's Stan for Tourism Industry, etc. 	<ul style="list-style-type: none"> ▶ Streamlines work processes and promotes collaboration across functions and teams, increasing efficiency ▶ Cost-effectiveness, as cloud-based solutions require lower upfront financial outlays with no/less need for physical hardware and infrastructure, and typically adopt a subscription model
Procurement & Finance	<ul style="list-style-type: none"> ▶ Obtain a consolidated overview of the entire procurement process and real-time expenses for better decision-making and efficiency ▶ Easily access all contracts on the go via a central cloud-based repository 	<ul style="list-style-type: none"> ▶ Allows room for scalability; hotels can upgrade or downgrade software features and functionalities depending on their needs
Human Resources	<ul style="list-style-type: none"> ▶ Understand the profile of employees who stay in the job and succeed to augment better recruitment and retaining of the most suitable staff 	<ul style="list-style-type: none"> ▶ Updates to software can occur automatically without having to schedule a time and incur heavy maintenance costs

CONSIDERATIONS FOR ADOPTION

- ▶ Validate the security of cloud providers – they should comply with the cloud and data protection standards adopted by the industry.
- ▶ The security of cloud-based platforms must be maintained constantly to safeguard against malware and hacks.
- ▶ Ensure that the hotel's internet speed and bandwidth can support cloud-based technology to prevent time or system lags.
- ▶ Highlight the benefits of these solutions to employees and provide them with training to get their support.
- ▶ Moving legacy applications to the cloud does not mean that the hotel will automatically reap the full benefits of cloud systems. The value of cloud computing comes from approaching it not as a one-off tactical decision but as a part of a holistic strategy for digital transformation, and integrating the solutions via open APIs.

THE SCENE: Swissôtel the Stamford and Fairmont Singapore



THE SITUATION...

The process of making group reservations was time-consuming and inefficient. Spreadsheets were used to collect group reservations data from the guests. Event planners would spend hours chasing guests to complete their spreadsheets so that they can compile the data into a single rooming list for the hotel. The reservations team then manually inputs each group reservation into the hotel's PMS.

The entire process was prone to human error and personal data breaches. More importantly, the hotel was unable to directly engage guests at the time of booking, thus missing opportunities for upselling and identification of loyalty members.



THE SOLUTION...

A cloud-based group reservations solution automates the manual processes by integrating with the PMS and eliminating the need for rooming lists.

- ▶ The sales team can now create an event-branded booking microsite where attendees will book their rooms, with their details sent straight to the hotel's PMS.
- ▶ Direct engagement with the guests start at the point of booking – guests can now extend stay, upgrade room type, sign up to the loyalty programme and subscribe to the hotel's marketing materials all on the same site.
- ▶ Through a single dashboard, the reservations and sales teams can fully track engagement throughout the process, receive real-time updates, and uncover booking insights.
- ▶ Clients and guests can change reservations up till the date of the event since it is no longer tedious to update changes in the PMS, increasing guest satisfaction.



RESULTS...

On average, hotels that adopted such a solution achieved the following outcomes:

- ▶ Significant time savings:
 - ▷ Reservations team saves 2 minutes per reservation from rooming list (Corporate, MICE, Leisure and Air Crew) as they do not need to manually input reservation details into the PMS.
 - ▷ Sales team requires only minutes (reduced from a few days) to create a booking website to process group reservations.
 - ▷ Sales team can assess the dashboard anywhere, so they can effectively engage clients and secure business on the go.
- ▶ Increase in revenue and cost savings:
 - ▷ Average of 14% incremental group revenue from offering pre- and post-nights and upgraded room types.
 - ▷ Real-time visibility of every reservation helps optimise room revenue and inventories.
 - ▷ Less need to hire casual labour to enter rooming lists during peak seasons.
 - ▷ Reduced workload and greater flexibility for event planners helps the hotel retain groups and secure more events and clients.



CONSIDERATIONS...

- ▶ Factor some time to integrate the solution with the PMS to ensure maximum savings in productivity.
- ▶ Effective change management helps the teams understand the benefits of the new platform in helping with their work.

INTERNET OF THINGS (IoT)

WHAT THIS TECHNOLOGY IS

The Internet of Things (IoT) is a giant wireless network of interconnected objects with sensors and actuators capable of collecting and exchanging data over the internet. This increases automation and allows multiple devices to be controlled or monitored from one centralised platform. Hotels can then use this data to uncover new business insights and actionable opportunities.

Radio Frequency Identification (RFID), Bluetooth Low-Energy (BLE) and Global Positioning Systems (GPS) are commonly known as the types of technology within the realm of IoT that can be applied to the hospitality context.



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HOW CAN THIS TECHNOLOGY BE USED AND WHAT ARE ITS BENEFITS?

FUNCTION	EXAMPLES OF USES	BENEFITS
Front Office	▶ Easily identify luggage via blinking tags in the packed storeroom, so a time-consuming search is not needed	▶ Optimises revenue and increases cost savings from: ▷ Better operational efficiency in existing tasks and workflows ▷ Improved utilisation of existing assets ▷ Saving energy without compromising guests' comfort ▷ Increased opportunities to customise upselling and drive revenue
F&B / Banquet	▶ Active and automatic tracking of food inventory and food safety, without the need for kitchen staff to manually count and monitor food stocks	▶ Hotel becomes more environmentally friendly, leading to: ▷ Energy and water savings ▷ Reduction in waste ▷ Less need to replace equipment due to predictive maintenance
Housekeeping	▶ Detect when the room is occupied to help optimise housekeeping operations and activate in-room energy-saving mode ▶ Track open and used minibar items so staff do not need to manually check and replenish them ▶ Track real-time location of dining trays and rollaway beds, so staff can act swiftly on guests' requests. ▶ Help locate uniforms easily 24/7, so staff can start their shift efficiently	▶ Enhances the overall experience for both guests and staff: ▷ Seamless and high-touch guest experience from check-in to check-out ▷ No more tedious and lower-value work for staff due to higher levels of automation
Engineering	▶ Adjust lighting automatically in guest rooms and public areas based on the amount of ambient light ▶ Remotely monitor meter readings (e.g. chiller energy data, temperatures) to ensure optimal equipment conditions and pool water quality ▶ Predictive maintenance; identifying and fixing potential problems before they become real issues	
Physical Security	▶ Automatically detect presence of unauthorised persons in out-of-bounds areas and instantly notify the authorities without the need for patrols	
Sales & Marketing / Revenue Management	▶ Identify location of guests in the hotel and automatically alert them of contextually relevant promotions to entice sales ▶ Gather new and more business intelligence on customer behaviour that can be included into revenue and pricing strategies to optimise revenue	

CONSIDERATIONS FOR ADOPTION

- ▶ A phase-by-phase plan for IoT adoption for each department should fit into an overall strategy.
- ▶ Ensure the devices are interoperable so they can communicate with each other.
- ▶ An all-integrated solution might require large volumes of sensors installed throughout hotel.
- ▶ Determine the power sources of IoT devices (e.g. passive vs reactive RFID tags, BLE beacons), and consider their maintenance frequency when batteries are used for power.
- ▶ Wi-Fi blind spots within the building may affect communication among devices.
- ▶ Consider the risks of user privacy violations; be aware of applicable privacy regulations, e.g. Singapore's Personal Data Protection Act (PDPA), and ensure that no vulnerabilities are introduced when multiple networks with different approaches to security are involved.
- ▶ The embedded security of devices is as important as software security; therefore avoid vendors that appear hesitant to commit to upgrading the devices' security.

THE SCENE:



THE SITUATION...

Engineering teams in the group had to manually conduct time-consuming and inefficient daily operations to ensure scores of critical equipment such as chillers and heat pumps were running smoothly. They faced the following issues:

- ▶ **Data collection:** Every day, shift technicians collected and noted chiller and energy readings on paper. They would then manually input these data into a spreadsheet, before analysing them for operational issues.
- ▶ **Data storage & management:** Data was stored physically in many box files, which had to be physically retrieved and checked by admin assistants for data validation – a very tedious and cumbersome task.
- ▶ **Reporting & analysis:** Engineers were notified only after technicians reported issues on an ad-hoc basis. Due to a lack of real-time info, the team had to meet up to analyse the situation. By then, the issue might have already worsened and affected business.
- ▶ **Equipment knowledge:** As hotels in the group used different equipment, the information collected was in silos, making it tedious to systematically train or share best practices among the engineering teams.



THE SOLUTION...

The entire hotel group deploys the same Building Energy Management System enabled by IoT, AI digital assistant and data analytics. Tedious and manual tasks can be reduced, and more time is now available for preventive maintenance.

- ▶ With cost-effective IoT wireless sensors installed on all critical equipment, chiller and energy readings are now collected in real time and transmitted directly to the cloud database.
- ▶ No manual checks are needed due to real-time data validation and analysis. Data is stored digitally in the cloud and can be retrieved anytime, anywhere using an app.
- ▶ Operational issues are sent directly to the technicians in real time, and resolutions can be discussed via the AI chat-bot/digital assistant. All reports are digitally generated via pre-defined report and metric templates, removing cumbersome admin work.
- ▶ The AI chat-bot/digital assistant helps the engineering team conduct predictive and preventive maintenance effectively, answering staff members' questions and facilitating knowledge transfers.



RESULTS...

- ▶ Estimated productivity savings of 13.2 daily man hours per property.
- ▶ No need for storage of physical data records (a reduction from 348 pages per chiller per year to zero).
- ▶ Improvement in operational efficiency and energy savings, aligning with the group's commitment to sustainability.
- ▶ Anticipated increased knowledge sharing between properties, ensuring continuity.



CONSIDERATIONS...

- ▶ Work closely with vendor to communicate the benefits of adopting AI technology to employees, to help them overcome initial reservations.
- ▶ Involve staff when building the AI chat-bot to ensure that it addresses their pain points. Consider employing at least one AI-trained technician to expedite knowledge acquisition and technology adoption process within the team.

CASE STUDY #2: INTEGRATED & ENERGY-SAVING SMART IN-ROOM TECHNOLOGY

THE SCENE: Swissôtel the Stamford Singapore



THE SITUATION...

The hotel faced several operational inefficiencies, as its various systems like PMS, housekeeping, engineering and room calls were not interconnected. Its high energy consumption was also not sustainable and costly.

- ▶ Room attendants had to go from floor to floor to check if the "Make up Room" (MUR) or "Do Not Disturb" (DND) signs were on, before being able to clean the rooms.
- ▶ When guests required laundry services, linen staff received calls from the operator and headed to the rooms, but had to wait outside if the "DND" sign is on. They then had to call the operator to inform the guests that they are outside.
- ▶ When there was a HVAC system fault, the engineer visually inspected the room before heading back to the office to fetch the right tools and spare parts, making multiple trips to fix an issue.
- ▶ Guests sometimes left the air-conditioning and lights on despite leaving their rooms for a long time, resulting in energy wastage.



THE SOLUTION...

Sensors installed in the guest rooms, and integrated with the HVAC, in-room controls, PMS, housekeeping and engineering systems via open APIs, help to:

- ▶ Detect when rooms are unoccupied and/or empty through PMS integration and lower energy consumption by automatically adjusting cooling and lighting levels.
- ▶ Pick up other real-time information such as temperature, humidity, remote fault detection of components and guest requests via in-room control panels (e.g. laundry pickup, MUR or DND).
- ▶ Share and present them in real time on a single dashboard, giving the hotel complete visibility of operations to act on requests swiftly or monitor conditions remotely.

Staff's work processes are optimised:

- ▶ Housekeeping manager can see which rooms have turned on the MUR and DND via the e-housekeeping app, and can prioritise room cleaning and assign staff accordingly.
- ▶ Linen staff can see which rooms have requested for laundry pickup, and if they are on DND mode, via the e-housekeeping app. They can either call guests or wait till they leave the rooms for laundry collection, eliminating wasted trips.
- ▶ Engineering staff can remotely adjust a room's temperature to test for a stuck valve, establishing the cause of the malfunction, before they make a single trip there for repairs.

Guest experience is enhanced when dynamic in-room night light sensors automatically illuminate the floor with low-level lighting when they leave their bed at night, increasing their safety.



RESULTS...

Guestrooms in the hotel equipped with this solution achieved:

- ▶ 28.5% in average annual energy savings per guest room
- ▶ Projected increase in staff productivity by 20%-25% after the sensors were deployed. Once integrated with the PMS, housekeeping and engineering systems, projected productivity savings further rose to 30%-35%.
- ▶ Increased guest satisfaction, with more reviews on TripAdvisor praising the Smart in-room lighting system.



CONSIDERATIONS...

- ▶ Seamless integration of the sensors and hotel systems (especially the PMS) via APIs is paramount for the hotel to reap maximum benefits.
- ▶ Align the various systems before going "live" to ensure a smoother transition.
- ▶ Ensure staff are trained on the new solution and understand how it benefits them in their daily work.

THE SCENE: Mandarin Oriental Singapore



THE SITUATION...

The housekeeping team faced the following challenges:

- ▶ On top of room cleaning, the attendants had to manually keep stock of the various amenities (toothbrushes, soap bottles etc.) stored in every housekeeping pantry on each floor and in the main storeroom. This process is time-consuming and prone to human error.
- ▶ There was no way for the housekeeping runners to know when an amenity item was running low or due for top-up. The runner had to check actual stock levels in each pantry, notify his colleague to update the main storeroom inventory, then proceed to top up stocks in all 16 pantries.
- ▶ When some amenities were used up faster than others, room attendants had to run to different pantries to look for replacements, wasting their time and leaving them frustrated and exhausted.



THE SOLUTION...

- ▶ An auto-inventory management system with pressure-sensitive plates measures the weight and monitors the real-time count of amenities in all pantries and the main storeroom. Staff are no longer required to manually monitor the inventory.
- ▶ The hotel can also configure individual trigger levels for each amenity. Once a certain stock count is below the threshold, the system automatically alerts the supervisor, who will notify the housekeeping runner to top up the affected pantry.



RESULTS...

- ▶ Estimated daily productivity savings of 16 man hours in the housekeeping team.
- ▶ Increased staff satisfaction as time-consuming tasks and guesswork for stock-taking are eliminated.
- ▶ Increased guest satisfaction as there is less waiting time for requested amenities.



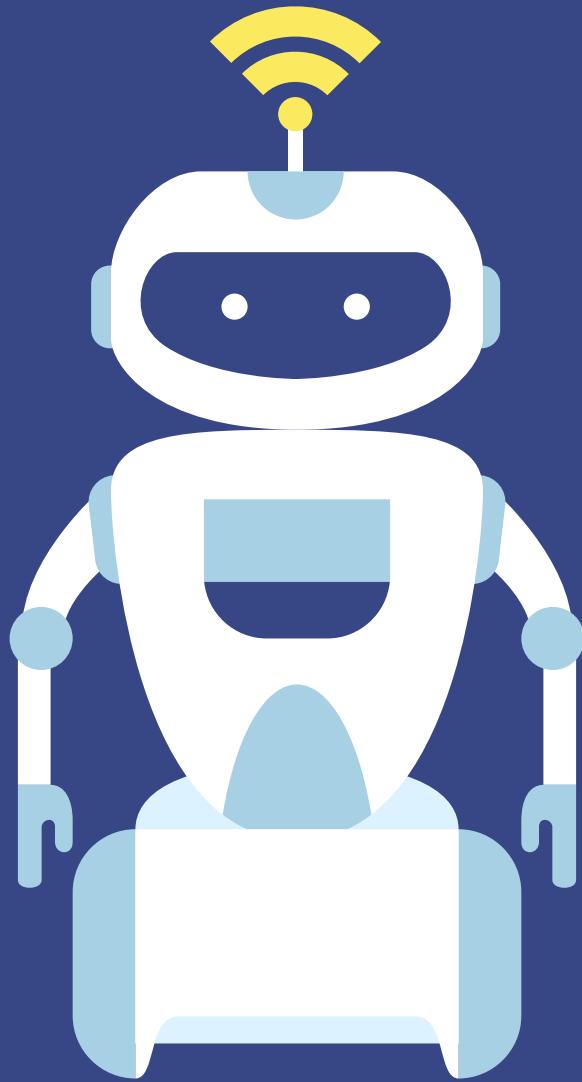
CONSIDERATIONS...

- ▶ It is important to include the ground staff from the start to ensure that their feedback and requests are considered when developing the solution.

ROBOTICS

WHAT THIS TECHNOLOGY IS

Fictional scenarios in futuristic sci-fi shows are slowly becoming a reality. Robots today are capable of autonomous movement, completing menial and repetitive tasks to replicate human actions, and providing data-driven insights acquired from these tasks.



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HOW CAN THIS TECHNOLOGY BE USED AND WHAT ARE ITS BENEFITS?

FUNCTION	EXAMPLES OF USES	BENEFITS
Front Office	<ul style="list-style-type: none"> ▶ Robot concierges integrated with STB's Tourism Information and Services Hub (TIH) can be deployed to meet and greet guests, and provide them with real-time destination and itinerary recommendations, alleviating the workload of the human concierge ▶ Autonomous luggage delivery carts integrated with hotel lifts can bring suitcases from the lobby to the rooms, reducing the need for the bellhop to make multiple trips 	<ul style="list-style-type: none"> ▶ Streamlines work processes by relieving staff from (i) repetitive manual work and (ii) basic service tasks, so they can concentrate on higher-value work or guest engagement ▶ Improves guest satisfaction by cutting waiting times and boosting novelty factor
F&B / Banquet	<ul style="list-style-type: none"> ▶ Kitchen robots standardise the cutting and dicing of ingredients, and prepare dishes and beverages that require repetitive movements (e.g. frying eggs, cooking noodles, making cocktails) ▶ Robotics asset movers help lift and move heavy banquet tables and chairs 	<ul style="list-style-type: none"> ▶ Carries out tasks with more accuracy and consistency
Housekeeping	<ul style="list-style-type: none"> ▶ Robotic vacuums clean public areas and rooms autonomously, relieving staff from the tedious task ▶ Linen delivery robots collect and transport dirty linens autonomously, so staff do not have to make repeated trips ▶ Service delivery robots deliver amenities and in-room dining to the rooms 	

CONSIDERATIONS FOR ADOPTION

- ▶ Consider leasing (e.g. Robot-as-a-Service) instead of purchasing robots to drive down the investment costs of hardware.
- ▶ Autonomous robots should be integrated with Wi-Fi and other relevant hotel systems in order to work appropriately.
- ▶ Legacy building infrastructure (e.g. uneven flooring, tight corridors) may pose mobility challenges for robots.
- ▶ Training in basic troubleshooting for hotel staff on the ground is highly recommended, so quick service and operations recovery can be carried out on malfunctioning robots instead of waiting for vendors to fix them.
- ▶ Staff should be assured that the robots are not replacing them, but will help in their work. Gaining support from employees is important to ensure that the solution is adopted properly.

CASE STUDY: AUTOMATED LINEN AND ROOM SUPPLY ROBOTIC TROLLEY

THE SCENE: Park Avenue Rochester, Singapore



THE SITUATION...

Housekeeping attendants had to transport both clean and soiled linen between floors throughout the day. This resulted in bottlenecks, especially during peak hours, translating to slower turnover of rooms. Housekeeping staff were also under significant strain from pushing around loaded linen trolley carts, which can weigh up to 40kg.



THE SOLUTION...

Two autonomous linen cart robots, integrated with the hotel lifts and e-housekeeping function, are deployed to transport soiled linen and room supplies. The senior linen attendant now remotely schedules the trolleys to come down in an orderly manner, removing bottlenecks.

At the start of each shift, room attendants pick up a cart of clean linen that the robot trolley had already delivered to each floor the night before. They then focus on room cleaning and just load the soiled linen into the trolley at the lift landing of each floor at a scheduled time. The robot then autonomously goes to each floor to collect the linen and bring it to the linen room.

Besides linen supplies, the robots also transport housekeeping amenities, so staff do not need to make unnecessary trips to the storeroom. The robots are able to handle a bigger load (up to 100 kg) per trip, and can work into the wee hours of the night, increasing productivity and efficiency.



RESULTS...

- ▶ Significant productivity savings of 19.3 man hours daily.
- ▶ The occurrence of work accidents and the number of staff reporting sick have also gone down, boosting staff morale and retention rates.



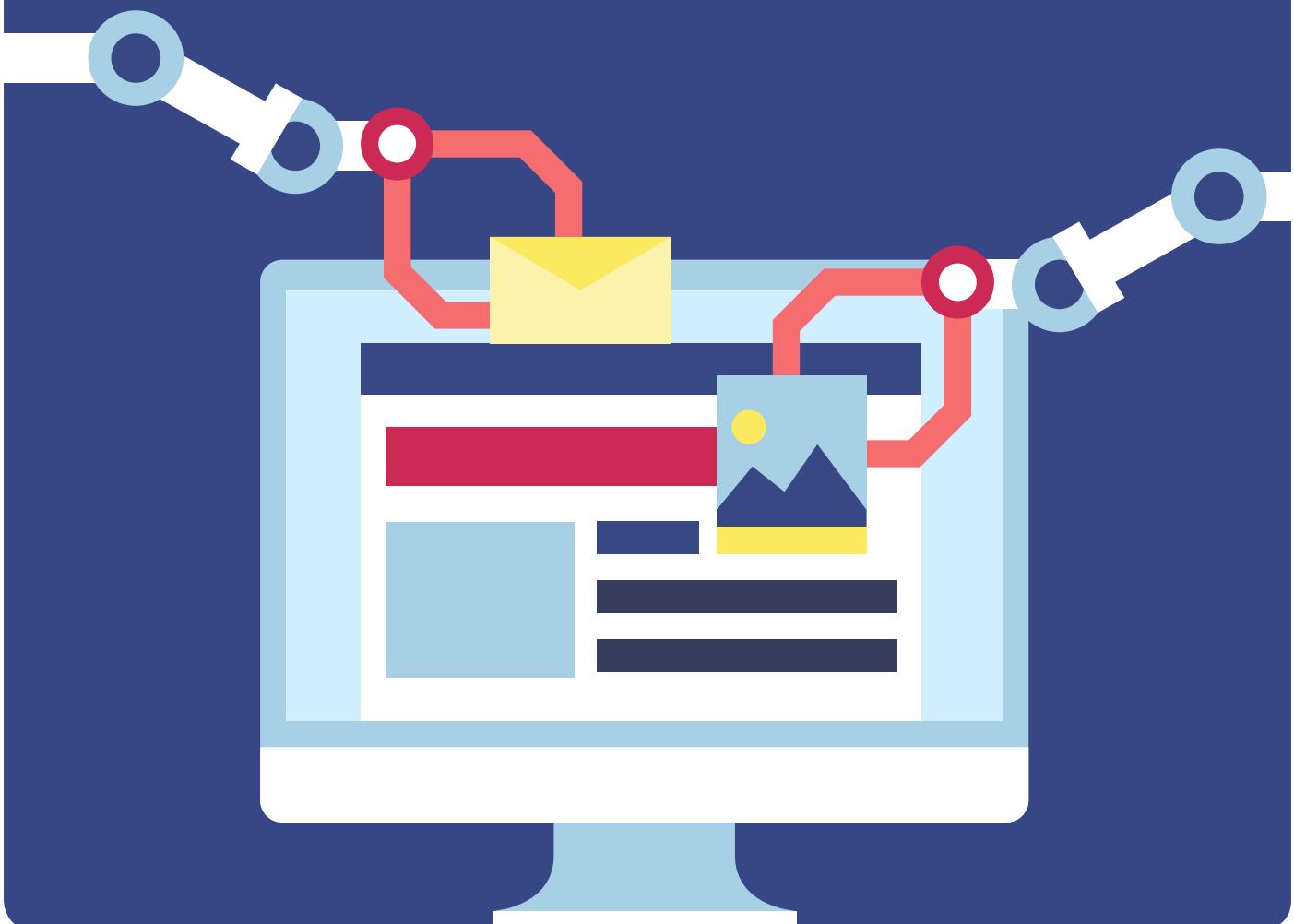
CONSIDERATIONS...

- ▶ Current building and spatial design such as narrow corridors might not be conducive for robots' movement, and might need to undergo physical alterations.
- ▶ The robots must be integrated with the lift system and Wi-Fi, so they can autonomously choose the right storey on the lifts.
- ▶ Staff concerns over the new technology should be addressed sensitively.
- ▶ Staff on the ground should be trained and empowered to conduct basic troubleshooting of the robots.

ROBOTIC PROCESS AUTOMATION (RPA)

WHAT THIS TECHNOLOGY IS

Robotic Process Automation (RPA) is technology that manages, executes and monitors repetitive front and back office processes that do not require human judgment, allowing employees to focus on tasks that are more complex. The basic premise of RPA is that a lot of the structured, rule-based, repetitive, mundane and low-value-adding administrative tasks currently being performed by human employees can be carried out by software robots – at a much faster pace, with zero mistakes.



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HOW CAN THIS TECHNOLOGY BE USED AND WHAT ARE ITS BENEFITS?

FUNCTION	EXAMPLES OF USES	BENEFITS
Front Office	<ul style="list-style-type: none"> ▶ Arrival emails to guests can be automatically sent pre-stay to prompt them to check in via mobile ▶ Guests can be automatically checked out when the express check-out box senses a key drop and reflects it accordingly in the PMS 	<ul style="list-style-type: none"> ▶ Achieves higher return in investment, with reduced operating costs and higher output
F&B / Banquet	<ul style="list-style-type: none"> ▶ The procurement of food and housekeeping supplies can be automated when IoT sensors detect that the quantity is going below a threshold 	<ul style="list-style-type: none"> ▶ Improves work processes, productivity and staff engagement as repetitive, mundane and administrative tasks are automated
Housekeeping		
Sales & Marketing / Revenue Management	<ul style="list-style-type: none"> ▶ The hotel's own rates and competitors' rates can be compared across multiple OTAs, Global Distribution Systems (GDS) and other channels for rate parity, and staff can be automatically alerted on exceptions ▶ Details from PMS and sales & event management systems can be automatically read and crosschecked at the end of each day, and business reports produced ▶ Cumbersome standard loyalty programme practices, such as recording of earned, redeemed and converted loyalty points, can be automated, and customer and product details can be automatically managed 	<ul style="list-style-type: none"> ▶ Enhances overall guest experience ▶ Eliminates human error and improves performance ▶ Improves compliance by ensuring all tasks are in line with regulations and/or audit guidelines ▶ Does not require substitution of existing IT systems; easily adoptable with quick wins
Procurement & Finance	<ul style="list-style-type: none"> ▶ Processing of invoices, bills, accounts payable, purchase orders and good receipts etc. can be fully automated ▶ Information from multiple legacy systems including ERP, data warehouse etc. can be automatically consolidated and reconciled based on pre-defined reporting templates ▶ A consolidated view of historical and real-time expenses is provided automatically, pulling data from contracts, supplier quotes and purchase orders from the cloud depository 	
Human Resources	<ul style="list-style-type: none"> ▶ Employees are automatically notified to attend training based on their skills, expertise and job requirements ▶ Employee time records are validated by automatically crosschecking data (e.g. absentee reports against time logged into the hotel system) and sending an auto-alert when info is missing or inconsistent 	

CONSIDERATIONS FOR ADOPTION

- ▶ RPA works best and produces maximum benefits in automating processes that are:
 - ▷ Rules-based and well-defined, with robust standard operating procedures and few exceptions
 - ▷ Repetitive and predictable
 - ▷ High-volume and involving access to multiple existing systems
- ▶ RPA bots cannot read any non-electronic information; the hotel might want to consider adopting optical character recognition (OCR) technology to convert images of printed text into soft copy machine-encoded text, reducing the need for manual data entry.
- ▶ Applying RPA to an inefficient process will not fix it; hotels should first focus on addressing the root causes or inefficiencies in technology before applying RPA.
- ▶ The RPA tool should be compatible with the underlying legacy applications to prevent escalating the cost of integrating the systems.
- ▶ Consider creating a dedicated RPA team that is responsible for gathering the hotel's pain-points and working directly with the RPA vendor to automate them.
- ▶ Consider adopting a RPA solution with AI capabilities, where bots can eventually become more intelligent by learning from mistakes, without needing human input to correct them.
- ▶ Ensure the RPA is easy to use so employees can deploy, manage and adopt it easily.

THE SCENE: Marina Bay Sands Pte Ltd (MBS)

MBS has been implementing a string of RPA projects since 2018. A Centre of Excellence workgroup was set up to work with multiple hotel departments to assess and prioritise processes for automation. Close to 30 processes, spanning across its various departments such as Front Office, Sales, Revenue Management, Finance, Procurement and Call Centre, are already automated via RPA.

CASE STUDY #1: AUTOMATED PMS CHECK-OUT ENABLED BY RFID CHECK-OUT BOXES BY FRONT OFFICE TEAM



THE SITUATION...

- ▶ With 2,561 rooms and suites, the express check-out process at MBS used to be a very hectic and tedious one. Throughout the day, the FO team had to manually collect dropped keys from its seven express check-out boxes spread across the three hotel towers.
- ▶ Once the keys are gathered, a group of FO team members would check these rooms out one by one in the PMS, causing a delay in releasing the rooms in the system. This leads to more delays for housekeeping in cleaning these rooms before releasing them for new check-ins.



THE SOLUTION...

- ▶ An RFID card reader installed in every express check-out box scans a dropped key card, and automatically sends an email to a centralised mailbox. The RPA "RFID Express Checkout Bot" reads the email, logs on to the PMS and checks out the room after validation, based on predefined business rules and logic.
- ▶ If any exceptions are encountered during processing, the Bot will push that request to a manual queue for a team member to handle.



RESULTS...

- ▶ Significant daily productivity savings of 12 man hours from a reduction in processing time.
- ▶ Reduction of waiting time for housekeeping to enter vacant, dirty rooms.
- ▶ Improvement in guest satisfaction due to faster check-ins.
- ▶ Better staff morale and retention.

CASE STUDY #2: AUTOMATED DOWNLOADING OF MONTHLY PURCHASE ORDERS BY PROCUREMENT TEAM



THE SITUATION...

- ▶ The procurement team downloaded and printed an average of 2,300 purchase orders (POs) from the procurement system for auditing on a monthly basis. The process was very time-consuming and stressful, usually involving several team members within a tight timeline at the end of each month.



THE SOLUTION...

- ▶ The procurement team now taps the RPA "PO Downloading" Bot, which will refer to a list of PO numbers from a compiled excel sheet, automatically save each extracted PO file into the database, and send it to print. A team member triggers the entire process with just a click.



RESULTS...

- ▶ Significant time savings per month, from 105 hours of manual work to 22 hours of automation.

CASE STUDY #3: AUTOMATED UPDATING OF ROOM TYPE RESTRICTIONS ON THE PMS BY REVENUE MANAGEMENT TEAM



THE SITUATION...

- ▶ Every day, the revenue optimisation team read a large spreadsheet detailing latest restrictions on room types based on upcoming group room blocks, etc. and manually updated the statuses of different room types for the next 365 days into the PMS – an error-prone and cumbersome process.



THE SOLUTION...

- ▶ For the Room Type Restriction process, the RPA bot will pick the specific date, room type, and restriction status from the spreadsheet and update the details in these fields into the PMS.
- ▶ For the Room Type Validation process, the RPA bot will cross check the restriction status of all the room types for the next 365 days with the input file and PMS Restriction report, and alert the team when the fields do not match.
- ▶ The Revenue team does the above every day with just the click of a button.



RESULTS...

- ▶ Significant time savings from 6 hours of manual work to 20 minutes of automation per day.
- ▶ Vast reduction in PMS input errors, allowing rooms and rates to be sold accurately and revenue better optimised.
- ▶ Revenue team now has more time to work on other revenue-generating projects.



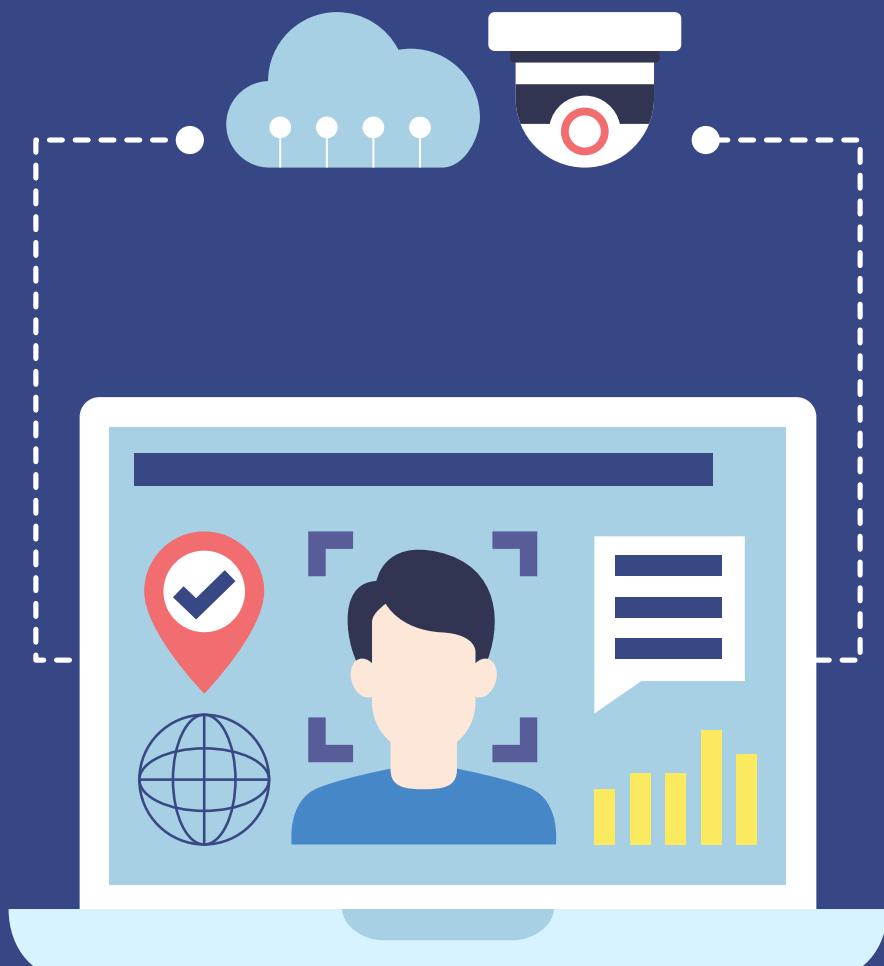
CONSIDERATIONS...

- ▶ Forming an internal process improvement team to work with the internal teams and the RPA vendor will help solve issues and deploy solutions more quickly.
- ▶ Partner closely with a RPA vendor that is able to provide knowledge transfer to team members.
- ▶ Involve the respective departments earlier, so staff can learn and acquire RPA skills and be more receptive and foster ownership when adopting the new technology.
- ▶ Select a RPA vendor that can provide both application and network security.

VIDEO ANALYTICS

WHAT THIS TECHNOLOGY IS

Video analytics is the use of computer algorithms to translate video footage into meaningful data for decision-making and aiding in operations. It is typically used to differentiate objects and identify behaviours or actions in real time. **Facial-recognition technology** is an example of video analytics – unique characteristics in the images or videos captured are matched against stored templates for the purpose of identification or authentication.



APPLICABLE HOTEL FUNCTIONS



FRONT
OFFICE



F&B /
BANQUET



HOUSEKEEPING



ENGINEERING



PHYSICAL
SECURITY



SALES &
MARKETING/
REVENUE
MANAGEMENT



PROCUREMENT &
FINANCE



HUMAN
RESOURCES

HOW CAN THIS TECHNOLOGY BE USED AND WHAT ARE ITS BENEFITS?

FUNCTION	EXAMPLES OF USES	BENEFITS
Front Office	<ul style="list-style-type: none"> ▶ Guests use facial recognition to check in seamlessly and unlock their rooms ▶ Automatically detect guest arrivals through facial recognition and provide the FO with the guests' profiles for enhanced guest engagement and upselling opportunities ▶ Large crowds in the lobby are detected via video, which notifies supervisors to deploy more staff to assist, thereby cutting waiting times 	<ul style="list-style-type: none"> ▶ Automates manual and resource-intensive tasks, improving operational efficiency ▶ Provides better insights to better inform planning decisions and enhance security and guest experience ▶ Reduces operating costs ▶ Mitigates loss and thefts and increases security ▶ Increases revenue-generating opportunities
F&B / Banquet	<ul style="list-style-type: none"> ▶ Detect guests' breakfast entitlement via facial recognition ▶ Detect loyalty club members at F&B outlet entrances, so F&B staff can greet them accordingly and entice them with customised promotions and upselling ▶ Detect vacated tables during hectic periods so open tables can be turned over to guests more quickly, reducing waiting times and eliminating inefficient workflow ▶ Detect types of cutlery and help stewards by sorting them accordingly 	
Physical Security	<ul style="list-style-type: none"> ▶ Reduce the need for labour-intensive patrols or monitoring of CCTV footage with intelligent video surveillance ▶ Track and detect unauthorised persons or suspicious behaviour ▶ Track and manage crowds more effectively 	
Sales & Marketing / Revenue Management	<ul style="list-style-type: none"> ▶ Detect moods, expressions and profiles of guests to increase upselling opportunities ▶ Track and analyse footpaths of guests to identify areas for upselling 	

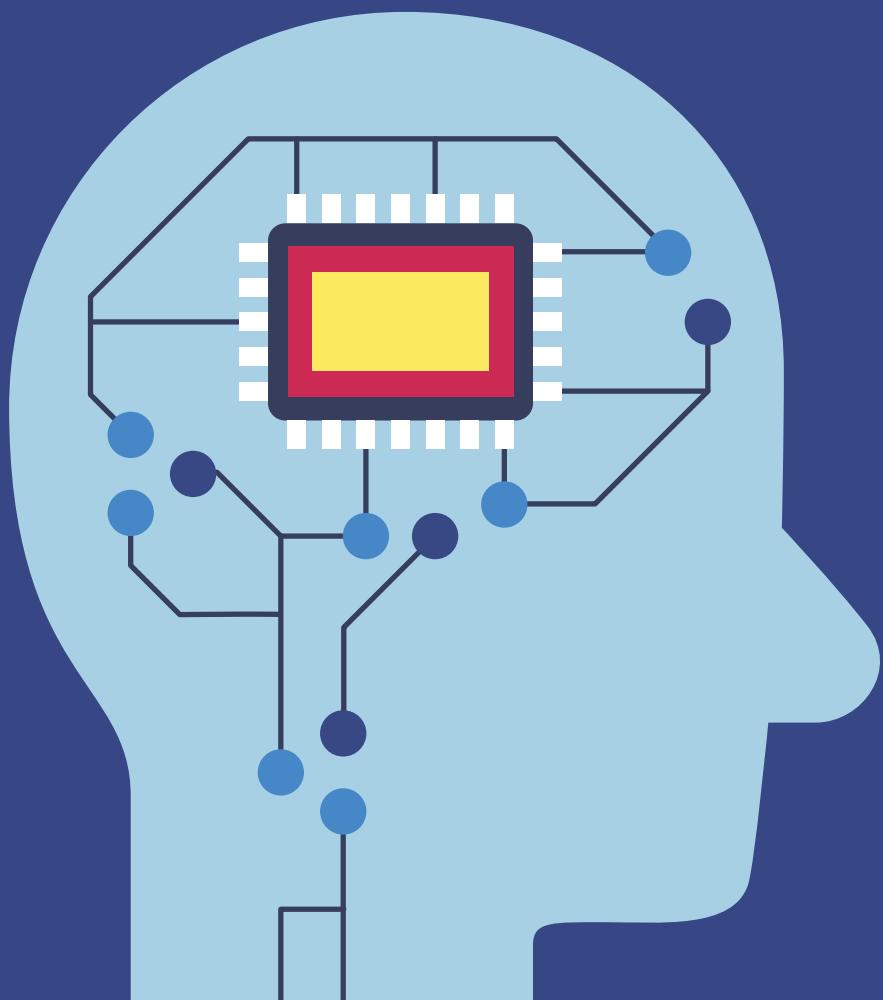
CONSIDERATIONS FOR ADOPTION

- ▶ Risks of user privacy violations; be aware of applicable privacy regulations, e.g. Singapore's Personal Data Protection Act (PDPA).
- ▶ Might require heavy investment in hardware like Smart cameras and system components.
- ▶ Take time to ensure that the solution is reliable and has a low risk of system failure and associated downtime.
- ▶ Intensive systems that have improved video analytics and image resolution might require more sophisticated video storage capabilities.

ARTIFICIAL INTELLIGENCE (AI) & MACHINE LEARNING

WHAT THIS TECHNOLOGY IS

Artificial intelligence (AI) allows machines to sense, comprehend, and learn so they can work and react as humans do. Applied with machine learning, AI helps recognise patterns and relationships in data sets to provide real-time – and even forecast – recommendations and suggestions.



APPLICABLE HOTEL FUNCTIONS



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HOW CAN THIS TECHNOLOGY BE USED AND WHAT ARE ITS BENEFITS?

FUNCTION	EXAMPLES OF USES	BENEFITS
Front Office	<ul style="list-style-type: none"> ▶ AI-enabled chat-bots interact with guests and answer their questions instantly, reducing waiting times ▶ Monitor previously asked questions and interactions so staff can better anticipate enquiries 	<ul style="list-style-type: none"> ▶ Guests enjoy highly personalised service ▶ Helps identify and predict potential issues, and provide suggestions to improve situations
F&B / Banquet	<ul style="list-style-type: none"> ▶ Identify and learn what types of food are wasted so chefs can plan how much to cook 	<ul style="list-style-type: none"> ▶ Allows staff to make Smart decisions based on actionable insights
Housekeeping	<ul style="list-style-type: none"> ▶ Provide suggestions on ways to prepare guest rooms based on individual guest preferences captured during previous stays, anticipating their needs 	<ul style="list-style-type: none"> ▶ Generates new or optimised revenue streams
Engineering	<ul style="list-style-type: none"> ▶ Analyse and find the root causes of defects ▶ Reduce operating costs with predictive maintenance ▶ Reduce energy and water consumption 	<ul style="list-style-type: none"> ▶ Increases operating cost savings ▶ Makes hotel more environmentally friendly
Physical Security	<ul style="list-style-type: none"> ▶ Detect suspicious activity and send automatic alerts for staff verification 	<ul style="list-style-type: none"> ▶ Smart solutions will get smarter over time
Sales & Marketing / Revenue Management	<ul style="list-style-type: none"> ▶ Observe shifts and analyse both internal data (e.g. hotel occupancy rate, pricings) and external data (e.g. Stan for Tourism Industry, competitor pricings, airline demand) to help forecast patterns and recommend real-time optimal pricing strategies ▶ Perform targeted digital marketing with customised information ▶ Scan reviews and real-time social media posts to provide insights for marketing to act on 	
Procurement & Finance	<ul style="list-style-type: none"> ▶ Accurately classify and predict causes of non-compliance and errors in processes 	
Human Resources	<ul style="list-style-type: none"> ▶ Deploy manpower more effectively based on scheduling and occupancy patterns 	

CONSIDERATIONS FOR ADOPTION

- ▶ AI is only useful if it can draw from a large amount of data. Therefore, hotels should entice guests to use the hotels' platforms as much as possible.
- ▶ Risks of user privacy violations; be aware of applicable privacy regulations, e.g. Singapore's Personal Data Protection Act (PDPA).
- ▶ AI may not be able to address all queries, and works better when paired with a human employee – at least till AI assistants are better trained to handle new questions through machine learning.

CASE STUDY #1: FOOD WASTE-TRACKING AI MACHINE

THE SCENE: Andaz Singapore



THE SITUATION...

The hotel generated a large amount of food waste daily. However, the original food waste measuring process in place was laborious and inefficient. Kitchen staff were required to manually ascertain the amount and type of food waste and then enter the data into a spreadsheet. Data was not consistently tabulated, while the practice also did not align with the hotel's commitment to sustainability.



THE SOLUTION...

- ▶ Kitchen staff throw food waste into a bin fitted with a food waste-tracking AI machine (pilot version) which automatically tracks the identity and weight of the waste via a Smart camera, sensors and image-recognition technology for seamless documentation. The system's AI capabilities help the machine become smarter day by day, as it learns to recognise and categorise different types of food thrown into the bin.
- ▶ The data is then sent automatically to its cloud server to generate actionable insights for their chefs. This allows them to better monitor the food stations and food production in real time and plan resources more effectively, reducing food costs and environmental impact.



RESULTS...

- ▶ Approximately 20% reduction in food waste within the first few trial months.
- ▶ Kitchen staff can adjust operations with data on the exact amounts and specification of the food waste. For example, instead of putting all the smoked salmon on one big plate and releasing it to the buffet line, the portion is now split into three smaller plates, which are released one at a time, so there is less need to throw out leftovers.
- ▶ Direct dollar and productivity impact is achieved.



CONSIDERATIONS...

- ▶ Time is needed for the AI machine to learn the various types of food the kitchen typically prepares and discards.
- ▶ Training of staff is important so the solution is used properly and patterns can be better analysed to generate usable insights.

THE SCENE: Hotel ICON, Hong Kong



THE SITUATION...

The hotel's club and suite rooms take up 38.5% of its total room inventory, but demand from guests for standard rooms had been overwhelming compared with that of the higher-priced rooms. This resulted in overbooking of standard rooms, forcing the hotel to give out free room upgrades, leading to revenue loss.

The hotel's revenue team also faced other challenges:

- ▶ They were bogged down by administrative data-entry work due to lack of automation.
- ▶ The hotel's catering and meetings demand, delegate density and inquiry levels were not incorporated well into revenue strategies.
- ▶ Insights into future trends and business demand was lacking, so the hotel could not plan adequately for its manpower operations and costs, F&B supplies and energy consumption.



THE SOLUTION...

- ▶ An AI-enabled revenue management system (RMS) helps the hotel accurately forecast demand and price its room inventory based on different room categories to achieve optimal total revenue.
- ▶ Using AI and machine learning, the RMS incorporates both internal and external data (e.g. competitor rates, reputation ratings, consumer OTA shopping behaviour and overall market demand levels), into its algorithms. This helps in forecasting demand more accurately and granularly – by room type, segment, day and length of stay. The team now only needs to review alerts, rather than question if their room rates are the most optimal based on demand.
- ▶ The hotel also integrated the RMS with a meeting and events management solution, so all three revenue-generating areas (rooms, meetings and catering) are considered when making strategic revenue, inventory and operation management decisions.



RESULTS...

- ▶ Better financial outcomes were achieved within 3 months:
 - ▷ 4.51% year-on-year (YOY) growth in RevPAR for its higher-value club and suite rooms
 - ▷ 7.35% YOY increase in Average Daily Room rate
- ▶ By not doing data entry, the revenue teams saved 2 man hours per day.
- ▶ By knowing in advance when the busier days for arrivals/departures are, service staff can be better rostered so better service is provided.
- ▶ More flexible, dynamic pricing is available, and a wider range of room types are open for booking.



CONSIDERATIONS...

- ▶ It is important that the entire organisation is supportive of the new tools to ensure maximum benefit.

YOUR TRANSFORMATION JOURNEY AWAITS

A Smart Hotel experience is possible today – most of the technology solutions presented in previous sections are already adopted by hotels and organisations in Singapore and overseas. Some might appear nascent for the hotel industry but have been developed and proven in other industries. Harness the power of digital technology to help your hotel navigate existing challenges and prepare for future trends. Embark on a holistic digital roadmap for your hotel today.

AVAILABLE GOVERNMENT SUPPORT AND TOOLKIT



Resources for Smart Hotel Transformation Singapore Tourism Board

A full suite of resources to help hotels in their transformation journey is available, including this Smart Hotel Technology Guide that aims to inspire hotels and identify opportunities to become smarter.



SMART HOTEL TECHNOLOGY GUIDES

Resources to inspire and identify opportunities to go digital

1. **Smart Hotel Technology Guide 2018 (Guest Experience Journey)**
2. **Smart Hotel Technology Guide 2019 (Backend Operations)**



HOTEL INDUSTRY DIGITAL PLAN (IDP)

Guide on digital solutions and training required for each stage of your business growth



DIAGNOSTIC TOOL (AVAIL IN 1H2020)

A tool to self-diagnose areas of gaps and opportunities



TECH COLLEGE

A series of masterclasses on Digital Transformation to educate participants on technology, innovation and data

[Click for more info](#)



Business Improvement Fund (BIF)

Singapore Tourism Board



This fund aims to encourage technology innovation and adoption in the tourism sector to enhance productivity and competitiveness. Proposed projects should fall under one of the categories below.

Up to **70%** funding on qualifying costs for Small Medium Enterprise (SME) applicants, and up to **50%** funding on qualifying costs for non-SME applicants.

SERVICE EXCELLENCE

Review and/or design service strategies and standards, and technological solutions to enhance customer service.



ENHANCE BUSINESS PROCESSES

FOR PRODUCTIVITY

Optimise productivity or resource allocation through automation, customised solutions or productivity diagnosis.



FINANCIAL MANAGEMENT

Develop financial management framework and strategy to improve financial processes.



HUMAN CAPITAL DEVELOPMENT

Strengthen HR capabilities to attract, develop and retain talent.



PRODUCT DEVELOPMENT

Leverage technology to develop innovative products and services for commercialisation.



BRANDING & MARKETING

Review, research and develop brand and/or marketing strategies.



[Click for more info](#)



Training Industry Professionals in Tourism (TIP-iT)

Singapore Tourism Board

This fund supports Singaporean employees, talents and leaders in upgrading or acquiring new skillsets, which can include upskilling to deal with the use of technology in the course of their work.

Up to **50%** funding on qualifying costs which includes course fees, COLA, Absentee payroll, etc.





Click for more info



Job-Redesign Toolkit

Workforce Singapore, Singapore Tourism Board, Singapore Hotel Association, Food, Drinks and Allied Workers Union (FDAWU)

An online, self-help tool to guide hotels in designing and implementing job redesign (JR). Developed in consultation with the industry, the toolkit comprises the following components:

SOLUTION FINDER

Recommends JR solutions based on hotel functions and guest experience journey.



WAGE MODEL

Guides wage review for redesigned jobs.



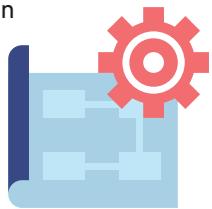
CHANGE MANAGEMENT FRAMEWORK

Provides tips on driving change management from leadership to workers.



JR IMPLEMENTATION GUIDE

Provides step-by-step implementation templates.



JR FUNDING & RESOURCES SUPPORT

Provides information on available funding schemes, successful case studies, HR best practices and industry trends.



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HOTELS

<i>AccorHotels Singapore</i>	<i>Grand Hyatt Singapore</i>	<i>Pan Pacific Hotels Group</i>
<i>Amara International Hotels & Resorts</i>	<i>Hotel ICON, Hong Kong</i>	<i>Park Hotel Clarke Quay</i>
<i>Andaz Singapore</i>	<i>Hotel Jen Orchardgateway</i>	<i>Shangri-La Hotel Singapore</i>
<i>Banyan Tree Hotels and Resorts</i>	<i>Mandarin Oriental Singapore</i>	<i>Singapore Marriott Tang Plaza Hotel</i>
<i>Copthorne King's Hotel Singapore</i>	<i>Marina Bay Sands</i>	<i>Swissôtel the Stamford</i>
<i>Fairmont Singapore</i>	<i>Meritus Hotels & Resorts</i>	<i>Swissôtel Merchant Court</i>
<i>Far East Hospitality</i>	<i>Millennium & Copthorne Hotels</i>	<i>The Ascott Limited</i>
<i>Frasers Hospitality</i>	<i>Park Avenue Rochester</i>	<i>The Fullerton Hotel Singapore</i>
<i>Grand Copthorne Waterfront Singapore</i>	<i>Park Regis Singapore</i>	<i>The Ritz-Carlton, Millenia Singapore</i>
	<i>Pan Pacific Singapore</i>	

NON-HOTEL ORGANISATIONS

<i>Hospitality Technology Next Generation (HTNG)</i>	<i>Association of Singapore Housekeepers (ASH)</i>	<i>Republic Polytechnic</i>
<i>Association of Room Divisions Executives (ARDE) Singapore</i>	<i>Hospitality Information Technology Association of Singapore (HITAS)</i>	<i>SATS Catering</i>

An initiative of the Hotel Innovation Committee
Jointly developed by the Singapore Hotel Association and the Singapore Tourism Board