Attractions Technology Roadmap

Edition 1.0 (2023)

—

Singapore Tourism Board

Accelerating technology adoption by attractions in Singapore

Contents

Attractions can embrace the future with technology and innovation

The need for digital transformation has accelerated with the changing global landscape. Technology and innovation can pave the way for more growth opportunities for attractions, strengthen customer relationships and change the way of work.

Why you should use the roadmap

With technology and innovation permeating the tourism industry, attractions can look forward to more revenue generation opportunities, better ways of working and lower barriers to adopting sustainable practices.

Technology can drive operational efficiency through the elimination of time-consuming and manual processes. Customer experience can be elevated by adopting technologies to unlock greater visibility into customers' needs and preferences.

This roadmap aims to:

- Guide attractions of all digital maturity levels in their digital transformation journey
- Showcase how technology can be adopted to improve day-to-day operations and processes
- Empower attractions to take charge of their digital transformation journey

Understanding the scope of this technology roadmap

What does this roadmap cover?

This roadmap will articulate what a **smart attraction** looks like from the perspective of three key job functions:

Customer Service | **Sales and Marketing** | **Sustainability**

A total of 15 technologies will be highlighted, with each technology addressing a list of common challenges and opportunities based on the deep-dive interviews and surveys. For this inaugural edition of the roadmap, we are focusing on 3 job functions as identified by the industry: Customer Service, Sales and Marketing and Sustainability.

This roadmap was built with the purpose of showcasing possible technologies that attractions can implement and serves as a guide for attractions looking to improve their productivity and drive business transformation.

Ultimately, this roadmap should be integrated with the attraction's wider technology plans for other job functions, in order to drive an attraction-wide digital transformation.

A roadmap that is co-developed and validated with industry partners

Desktop Research

Completed market landscape research and gathering information on case studies

Online survey

Conducted an online survey with **34 attractions** in Singapore to understand the industry's state of digitalisation, key gaps and challenges faced by each job function, and highlight opportunities for technology adoption

Interviews

Conducted **37 interviews** with selected attractions to deep-dive into current state of technology adoption and needs, gain deeper insights into their key gaps and challenges, and identify opportunities

Validated by industry and experts

Co-developed and validated roadmap with industry partners, technology experts and the Association of Singapore Attractions (ASA)

01

Executive Summary

We have completed industry-wide surveys and interviews, workshops and validation sessions with industry players and technology experts

01 Industry-wide surveys

34
attractions

Adventure & Rides, Entertainment & Lifestyle, Museums & Heritage, Nature & Parks

Outputs

Survey findings on
- Attractions' current state of digitalisation
- Key gaps and opportunities
- Respective job function challenges

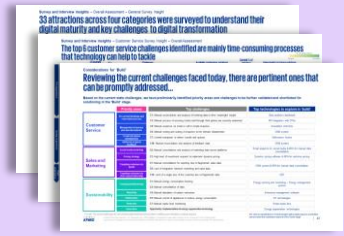
02 Deep-dive Interviews

37
interviews with 12 attractions

Outputs

Interview findings on
- Existing technologies adopted
- Existing challenges in business processes
- Visions for future state experience

Outcome
Market Landscape Report



03 Visioning Workshop

15
technologies validated

Outputs

- Envision the roadmap with industry representatives
- Guiding Principles
- Value and ease of technology implementation

04 Technology Review

Review of technologies with subject matter experts (SMEs)

Case study interviews with industry representatives on current technology implementations

Outputs

- Validation of roadmap with SMEs
- Case studies on successful technology implementations

05 Validation Workshop

Discussion on the technology roadmap, specifically on the key sections included, shortlisted technologies and implementation timeline with industry representatives

Outputs

- Detailed feedback on roadmap

Outcome
Final Technology Roadmap

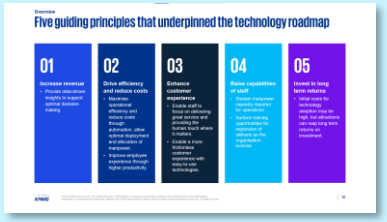
Supported by secondary research

Executive Summary

Summary of the roadmap: Overview

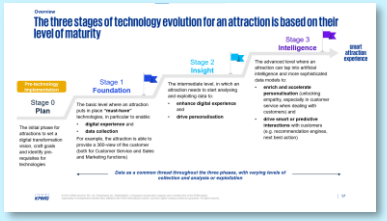
Global outlook

Global trends in the tourism industry and technology landscape



Guiding principles

Five guiding principles that was validated with industry players



3-stage approach

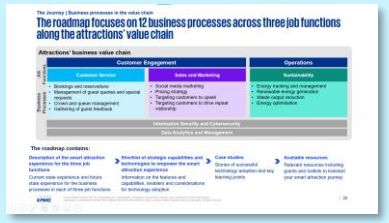
Overall framework for the attractions industry and overall implementation roadmap

Description of current states

Three descriptions of current states for attractions to assess their existing position in their digital transformation journey

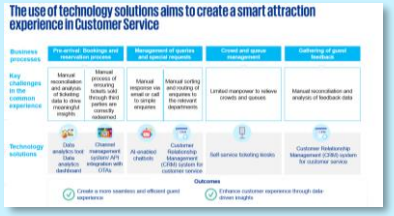
Executive Summary

Summary of the roadmap: The Journey



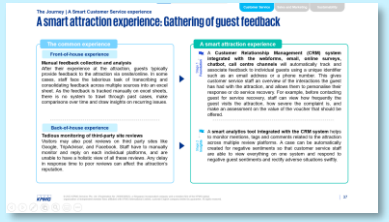
Business value chain

12 business processes in focus across the three job functions – Customer Service, Sales and Marketing and Sustainability



Overview of job function*

Key business processes, challenges of each job functions and respective technology solutions



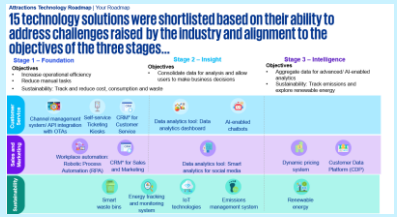
From common experience to smart experience*

Examples of common experiences of today that can be transformed into smart experiences with technology

This format will be replicated for Customer Service, Sales and Marketing and Sustainability

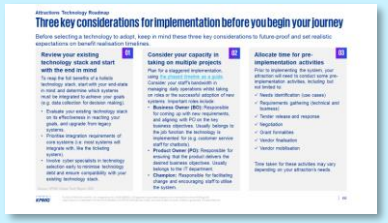
Executive Summary

Summary of the roadmap: Your Roadmap



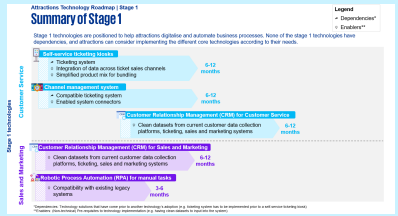
Technology categorisation

Categorisation and prioritisation of technologies across job functions into the three different stages



Key considerations prior to digital adoption

Three considerations prior to digital adoption for attractions to consider

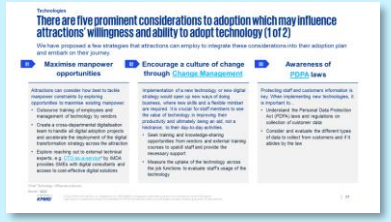


Phased timeline per stage

Summary of each of the three stages and the respective technologies

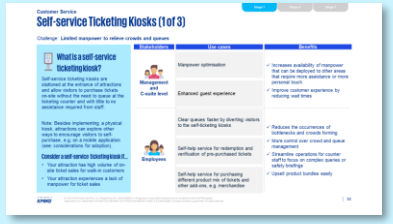
Executive Summary

Summary of the roadmap: Technologies



Key considerations during digital adoption

Five primary considerations and strategies for attractions to overcome common challenges faced in digital adoption



Technologies*

Details of individual technologies including use cases, benefits, features and considerations for adoption

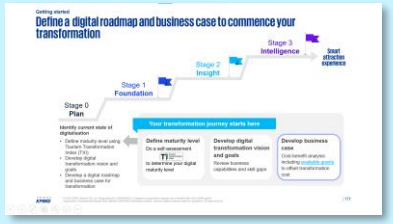
Case studies*

Curated case studies on successful implementation of technology by attractions, detailing challenges, considerations, results and pitfalls

This format will be replicated for Customer Service, Sales and Marketing and Sustainability

Executive Summary

Summary of the roadmap: Getting Started



How to get started

Steps that attractions can take to kickstart their digitalisation journey

Available support

List of available support such as grants and other relevant programmes (E.g. Tcube's Learn, Test, Build programmes)

02

Overview

Overall outlook for the attractions industry is positive although manpower constraints may prove a challenge, especially as traveller demands continue to evolve

01

Strong global outlook for tourism

As the world emerges from Covid-19, travel is resuming rapidly. Strong recovery is expected to continue in 2023, with full tourism recovery being anticipated by 2024.

Source(s): United Nations World Tourism Organization; Economist Intelligence Unit; Singapore Tourism Board; Today Online

02

Manpower a key challenge impeding rebound

As the tourism sector picks up, manpower needs continue to build especially after downsizing during the pandemic. The availability of manpower will be a major factor impeding their rapid recovery.

Source(s): The Straits Times; Channel News Asia; VisitSingapore.com; KPMG Analysis based on expert interviews

03

Changing traveller customer needs post-pandemic

The tourism sector is facing new customer needs.

In particular, consumers surveyed indicated three key trends to look out for:

- **Sustainable travel**
  56% of respondents believe that sustainability in the travel and tourism sector is more important now than it was 12 months ago in influencing their purchase decision
- **Inspirational travel**
  43% of respondents will use virtual reality to experience the destination virtually, which will influence their choices
- **Experiential travel**
  70% of respondents state they are interested in cultural immersion and taking a tour on future trips; Singapore recorded one of the highest international tourist spending on experiences

Source(s): KPMG Me, My Life, My Wallet 2022; Booking.com; AmericanExpress; Mastercard

04

Technology is changing the way we do business

From the use of super-apps to hyper-personalisation and recommendation engines, to kinetic energy flooring and blockchain, the industry is changing rapidly to address changing customer needs, and to provide differentiated experiences at scale.

Source(s): KPMG Analysis; Forbes; Blooloop; The Business Times; Kaer; AWS; Cooling as a Service Initiative; Pavegen

Five guiding principles that underpinned the technology roadmap

01

Increase revenue

- Provide data-driven insights to support optimal decision-making.

02

Drive efficiency and reduce costs

- Maximise operational efficiency and reduce costs through automation, allow optimal deployment and allocation of manpower.
- Improve employee experience through higher productivity.

03

Enhance customer experience

- Enable staff to focus on delivering great service and providing the human touch where it matters.
- Enable a more frictionless customer experience with easy-to-use technologies.

04

Raise capabilities of staff

- Sustain manpower capacity required for operations
- Surface training opportunities for expansion of skillsets as the organisation evolves.

05

Invest in long term returns

- Initial costs for technology adoption may be high, but attractions can reap long term returns on investment.

The three stages of technology evolution for an attraction is based on their level of maturity

Pre-technology implementation

Stage 0 **Plan**

The initial phase for attractions to set a digital transformation vision, craft goals and identify pre-requisites for technologies.

Stage 1 **Foundation**

The basic level where an attraction puts in place **"must-have"** technologies, in particular to enable:

- **digital experience** and
- **data collection**

Stage 2 **Insight**

The intermediate level, in which an attraction needs to start analysing and exploiting data to:

- **enhance digital experience** and
- **drive personalisation**

Stage 3 **Intelligence**

The advanced level where an attraction can tap into artificial intelligence and more sophisticated data models to:

- **enrich and accelerate personalisation** and
- **drive smart or predictive interactions** with customers

Smart attraction experience

Data as a common thread across the three stages

A three-stage process to building a "smart attraction" experience

Focus of this roadmap

Pre-technology implementation

Stage 0 Plan

Identify current state of digitalisation

Use **STB's Tourism Transformation Index (TXI)** to review the current state experience and business capabilities, and identify business priority areas that requires digital transformation.

Stage 1 Foundation

Establish digital foundation

Streamline operations by digitalising business operations with core technologies, and automate data collection and consolidation.

Focus on sustainable practices that are quick wins

Focus on sustainability solutions that are easier to implement and have direct benefits on operations e.g. lower energy consumption.

Stage 2 Insight

Enhance data capabilities

Gain more in-depth insights of customers through connected systems.

Stage 3 Intelligence

Leverage intelligent automation

Drive smart and predictive interactions with customers, and accelerate personalisation of customer service.

Meeting longer-terms sustainability goals

Shift focus towards longer-term sustainability goals, such as reducing carbon footprint for sustainability certification purposes or switching to renewable energy which needs to be customised for each attraction's space constraints.

Smart attraction experience

- ✓ **Acquire strategic capabilities**
- ✓ **Enrich data analytics skills**
- ✓ **Foster culture of learning and continuous improvement**

Evaluate your attraction's current state of digitalisation to accurately select the most suitable stage to embark on (1 of 3)

Which description matches your attraction?

A

Capabilities

- No documented plan for digital transformation, with few avenues for exploring new digital solutions, and a limited view of the opportunities that digitalisation poses.
- Low digital-savviness across the organisation (i.e. few with relevant skills for digital implementation), with limited opportunities for structured upskilling.

Technologies

- Basic digital solutions are used including fundamental systems for customer service and marketing (e.g. booking and ticketing systems). Operational processes like ticketing remain manual and manpower-intensive.
- Data is collected in disparate systems, making analysis manual and challenging as data points cannot be reconciled.

Tourism Transformation Index **score guide**

Your TXI scores trend towards "Basic" and/or "Developing" for these domains:

TRANSFORMATIVE LEADERSHIP | TECHNOLOGY | DATA

Score range of 1 – 2.4

Examples of existing technologies adopted[1]

Online booking system

Data analytics for marketing (e.g. Google Analytics)

E-ticketing system to generate digital tickets

Survey tool for guest feedback

Retargeting tools (e.g. Google Ads, Facebook retargeting)

Embark on **Stage 1**

Source: [1] Based on Industry survey – examples of existing technologies most commonly adopted by attractions (i.e. with >70% adoption rate)

Evaluate your attraction's current state of digitalisation to accurately select the most suitable stage to embark on (2 of 3)

Which description matches your attraction?

B

Capabilities

- There is a documented plan for digital transformation, with some avenues for exploring new digital solutions. There is some level of awareness of the opportunities that digitalisation brings.
- A mix of digital-savviness across the organisations (i.e. some with relevant skills for digital implementation), with some opportunities for structured upskilling.
- Employees understand the significance of existing technologies and its benefits, but have some knowledge gaps in applying skills and knowledge to drive efficiency.

Technologies

- Some technologies to reduce manual tasks and collect basic data points (e.g. demographic information, ticket sale volume) have been implemented.
- The attraction has some data and analytics tools but they are not extensively used across the attraction. Analytical tools adopted offer shallow levels of insights that are insufficient to make data-driven decisions.

Sustainability practices

- There is a limited understanding of the importance of sustainability for the attraction, and the digital tools available. The attraction has undertaken few sustainable practices (e.g. manually ensuring electrical appliances are switched off when not in use, installing LED lights).

Tourism Transformation Index **score guide**

Your TXI scores trend towards "Developing" and/or "Established" for these domains:

TRANSFORMATIVE LEADERSHIP TECHNOLOGY DATA

Score range of 2.5 – 3.4

Embark on **Stage 2**

Source: [1] Based on Industry survey – examples of existing technologies most commonly adopted by attractions (i.e. with >70% adoption rate)

Evaluate your attraction's current state of digitalisation to accurately select the most suitable stage to embark on (3 of 3)

Which description matches your attraction?

C

Capabilities
- Clear vision and plan for digital transformation with many avenues for exploring new digital solutions.
- There are robust policies and procedures in place to enforce cybersecurity measures and enforce data security and privacy.
- There is an increase in emphasis on using data and analytics to make decisions. The attraction attempts to use historical data to target customers and personalise experiences.

Technologies
- Technologies implemented are largely integrated, and large volumes of data are available for analysis.
- The attraction uses data and analytics tools that generate in-depth analyses and insights. Attraction is exploring the use of predictive analytics to forecast future trends.
- The attraction is keen on adopting smart technologies, with Artificial Intelligence (AI) and Machine Learning (ML) capabilities to eliminate mundane and manual processes.

Sustainability practices
- The attraction has begun to explore sustainability technology to track and lower costs, and is aware of the importance of sustainable practices for the future.

Tourism Transformation Index **score guide**

Your TXI scores trend towards "Established" and/or "Advanced", with few "Leading" for these domains:

TRANSFORMATIVE LEADERSHIP TECHNOLOGY DATA

Score range of >= 3.5 (inclusive)

Embark on **Stage 3**

Source: [1] Based on Industry survey – examples of existing technologies most commonly adopted by attractions (i.e. with >70% adoption rate)

03

The Journey

From the common experience to a smart attraction experience

The Journey

Introduction:
Setting the context

The roadmap focuses on 12 business processes across three job functions along the attractions' value chain

Attractions' business value chain

Job Functions	Customer Engagement		Operations
	Customer Service	Sales and Marketing	Sustainability
Business Processes	• Bookings and reservations • Management of guest queries and special requests • Crowd and queue management • Gathering of guest feedback	• Social media marketing • Pricing strategy • Targeting customers to upsell • Targeting customers to drive repeat visitorship	• Energy tracking and management • Renewable energy generation • Waste output reduction • Energy optimisation

Information Security and Cybersecurity

Data Analytics and Management

The roadmap contains:

Description of the smart attraction experience for the three job functions

Current state experience and future state experience for the business processes in each of three job functions

Shortlist of strategic capabilities and technologies to empower the smart attraction experience

Information on the features and capabilities, enablers and considerations for technology adoption

Case studies

Stories of successful technology adoption and key learning points

Available resources

Relevant resources including grants and toolkits to kickstart your smart attraction journey

The Journey

From the common experience to a smart attraction experience:

Customer Service

The use of technology solutions aims to create a smart attraction experience in Customer Service

Business processes	Pre-arrival: Bookings and reservation process		Management of queries and special requests		Crowd and queue management	Gathering of guest feedback
Key challenges in the common experience	Manual reconciliation and analysis of ticketing data to drive meaningful insights	Manual process of ensuring tickets sold through third parties are correctly redeemed	Manual response via email or call to simple enquiries	Manual sorting and routing of enquiries to the relevant departments	Limited manpower to relieve crowds and queues	Manual reconciliation and analysis of feedback data
Technology solutions	Data analytics tool: Data analytics dashboard	Channel management system/ API integration with OTAs	AI-enabled chatbots	Customer Relationship Management (CRM) system for customer service	Self-service ticketing kiosks	Customer Relationship Management (CRM) system for customer service

Outcomes

- Create a more seamless and efficient guest experience
- Enhance customer experience through data-driven insights

A smart attraction experience: Bookings and reservations (1 of 2)

The common experience

Front-of-house experience

Disjointed third-party ticket purchase journey
Guests purchase tickets from an online travel agent (OTA), and have to redeem physical tickets at the ticketing counters. Staff has to manually verify the tickets individually.

A smart attraction experience

Stage 1 Foundation

Integrating the ticketing system with a channel management system/ API integration with Online Travel Agents (OTAs) lets guests buy tickets from OTA sites, and get instant confirmation on their purchases. Guests can now skip the redemption step and go head directly into the attraction, streamlining the experience of both guest and staff.

A smart attraction experience: Bookings and reservations (2 of 2)

The common experience

Back-of-house experience

Manual update of ticketing inventory
As the ticketing data is found across multiple OTA channels and its own booking system, the ticketing team is unable to understand trends in ticketing sales to drive revenue. Ticketing staff will also need to manually update their ticketing inventory when tickets are bought from OTAs.

Tedious reconciliation of ticketing data for analysis
To prepare a consolidated ticketing sales report, the staff has to spend a lot of their time manually consolidating and reconciling ticketing data across the various OTA channels and their own booking system. Additionally, a lot of time is spent manually analysing the large volume of data to make business decisions.

A smart attraction experience

Stage 1 Foundation

Ticketing inventory is updated in real-time, and this data from **channel management system/ API integration with OTAs** is combined with their sales through their booking channels using **a Customer Relationship Management (CRM) system** for greater insight. For example, staff may detect trends in seasonalities for their key markets in order to launch campaigns to promote packages in the following year.

Integrated with the ticketing and reservation systems, a CRM system helps to connect disparate data points. Customer data are now captured in a single view for staff to understand customer preferences and drive repeat visitorship. For example, if the CRM captures that a guest buys a set of two adult and two child tickets online for the attraction, staff can re-invite the guest to the attraction when there is a special family day event during the school holidays.

While the CRM provides basic reports and charts, a **data analytics dashboard can draw on the multiple sources of data** to provide enhanced data visualisations and give deeper customer insights. For example, the CRM can filter customers to show the segment of ‘customers with families’. A data analytics dashboard could allow drill through to display subsegments within the family segment by country of origin .

A smart attraction experience: Crowd and queue management

The common experience

Front-of-house experience

Manpower-reliant crowd management

Guests head to the ticketing counters to purchase tickets, redeem tickets from third parties, or verify their tickets. Group bookings may also have to be redeemed at the counter, as the staff needs time to verify the total size of the group. During busy periods, queues form and more staff have to be deployed to manage crowds. The onsite ticket sale and verification process remains heavily reliant on manpower, preventing staff from focusing on more complex queries.

A smart attraction experience

Stage 1 Foundation

Self-service ticketing kiosks can be implemented and integrated with ticketing and reservation systems. Kiosks can provide multilingual selections catering to foreign visitors, and upsell other add-on products. With the manual activity of selling, verifying and exchanging physical tickets outsourced to the kiosks, customer service staff can now provide assistance for more complex enquiries. Staff can redirect their focus to delight guests with personalised suggestions, or perform safety briefings.

A smart attraction experience: Management of queries and special requests (1 of 2)

The common experience

Front-of-house experience

Manual assignment and tracking of feedback and requests

When guests have queries about the attraction, staff will have to manually assign the enquiries from a shared mailbox to the relevant teams.

The purpose of the calls and emails are then tracked manually for analysis via emails, excel sheets and Google drive. The process of responding to, recording and analysing these requests is time consuming for the customer service team.

A smart attraction experience

Stage 1 Foundation

A **Customer Relationship Management (CRM) system** can automatically create cases from feedback or enquiries submitted through the webform, or emails to the shared mailbox. The customer service team will review the subject and content, tag pre-determined categories, and assign them to the appropriate departments to investigate or respond. The turnaround time for each case can be tracked, and alerts will be triggered to customer service manager if the case is not responded to on time, thereby improving the service quality. An overview of query and special request types can be viewed by the customer service manager in real-time, without the need for manual reconciliation.

A smart attraction experience: Management of queries and special requests (2 of 2)

The common experience

Delayed responses to straightforward enquiries

Even for straightforward enquiries (e.g. minimum age required to enter the attraction), guests may have to wait a few days for a response due to a high volume of queries. As a result, the guest might feel dissatisfied and the sales lead is lost.

A smart attraction experience

A **chatbot integrated with the CRM system** can help to respond to simple queries by pulling data from the FAQs or knowledge base repositories to give visitors an instant response. When the chatbot is unable to find the answer, a case can be created from the query and assigned to the appropriate department to respond. Customer service staff can add these answers to the FAQs to improve the chatbot over time.

Stage 2 Insights

When the **chatbot is AI-enabled** and powered by natural language processing, it can predict the users' intent and respond more accurately to queries over time. With round the clock availability, attractions can respond to customer enquiries beyond typical office hours, elevating service standards and freeing up staff to manage other more complex queries.

A smart attraction experience: Gathering of guest feedback

The common experience

Front-of-house experience

Manual feedback collection and analysis

After their experience at the attraction, guests typically provide feedback to the attraction via onsite/online. In some cases, staff face the laborious task of transcribing and consolidating feedback across multiple sources into an excel sheet. As the feedback is tracked manually on excel sheets, there is no system to trawl through past cases, make comparisons over time and draw insights on recurring issues.

Back-of-house experience

Tedious monitoring of third-party site reviews

Visitors may also post reviews on third party sites like Google, TripAdvisor, and Facebook. Staff have to manually monitor and reply on each individual platforms, and are unable to have a holistic view of all these reviews. Any delay in response time to poor reviews can affect the attraction's reputation.

A smart attraction experience

Stage 1 Foundation

A **Customer Relationship Management (CRM) system integrated with the webforms, email, online surveys, chatbot, call centre channels** will automatically track and associate feedback to individual guests using a unique identifier such as an email address or a phone number. This gives customer service staff an overview of the interactions the guest has had with the attraction, and allows them to personalise their response or do service recovery. For example, before contacting guest for service recovery, staff can view how frequently the guest visits the attraction, how severe the complaint is, and make an assessment on the value of the voucher that should be offered.

Stage 2 Insights

A **smart analytics tool integrated with the CRM system** helps to monitor mentions, tags and comments related to the attraction across multiple review platforms. A case can be automatically created for negative sentiments so that customer service staff are able to view everything on one system and respond to negative guest sentiments and rectify adverse situations swiftly.

The Journey

From the common experience to a smart attraction experience:

Sales and Marketing

The use of technology solutions aims to create a smart attraction experience in Sales and Marketing

Business processes	Social media marketing	Pricing strategy	Targeting customers to upsell	Targeting customers to drive repeat visitorship
Key challenges in the common experience	Manual consolidation and analysis of marketing data across platforms	Lack of information to determine optimal dynamic price	Manual consolidation for reporting due to fragmented sales data Lack of integration between marketing and sales data	Lack of a single view of the customer due to fragmented data
Technology solutions	Data analytics tool: Smart analytics for social media CRM*	Dynamic pricing system	CRM* Dynamic pricing system	CRM* Customer Data Platform (CDP)

Workplace automation: Robotic Process Automation (RPA) for manual tasks

Outcomes

- Drive efficiency by eliminating manual, repetitive tasks
- Drive revenue though dynamic pricing and understanding customer preferences

*Customer Relationship Management (CRM) system

A smart attraction experience: Social media marketing (1 of 2)

The common experience

Manual creation and publishing of marketing content across platforms

The marketing department routinely creates new marketing collateral to publish across their social media platforms (e.g. Facebook, Instagram, TikTok, YouTube) to drive traffic to the attraction. They face a challenge of developing content that best engages with their audience to drive sales (e.g. based on social media trends, competitors' social media content). In the event that guests have to be notified on urgent changes e.g. changing operating time due to unforeseen circumstances, the marketing team faces the challenge of publishing updates across all channels swiftly to manage guest expectations.

A smart attraction experience

Stage 1 Foundation

To ensure content is relevant for their audience, the attraction can use a **smart analytics tool** to track social media trends and sentiments relating to the attraction based on time period, provide benchmarks against competitors, and identify stories that best resonate with audiences. This information would be used to develop campaigns that have higher engagement and conversion rates.

A **Customer Relationship Management (CRM) system integrated with social media channels and website** allows marketers to post to multiple social media channels or the attraction's website, monitor brand mentions, message followers. The attraction can set rules in the CRM system to capture leads by creating contacts when users reply or mention the attraction on its social media platforms.

The **CRM** also integrates analytics data from the various social media platforms to show all the information in one place automatically. These data points include traffic and conversions from social media, number of followers and engagement rate.

A smart attraction experience: Social media marketing (2 of 2)

The common experience

Manual consolidation and analysis of marketing content across platforms to attribute sales to marketing spend

To optimise their ad spend, attractions have to manually navigate through the various platforms to consolidate data and analyse their performance. For example, checking Facebook Analytics (now replaced by Meta Business Suite) to view the budget, spend, return on investment (ROI) and cost per impression or acquisition, or checking Google Analytics for bounce rates, page views, time spent on pages and making sense of the correlation. This process is manual and a challenge for small marketing teams.

A smart attraction experience

Stage 1 **Foundation**

A **Robotic Process Automation bot (RPA)** can help to consolidate and reconcile campaign data from multiple sources such campaign management platforms and web analytics platforms (e.g. Google Analytics) that collect data along different parts of the marketing funnel. This reduces the manual effort required to create a clean data set to analyse conversion rate of ads to actual spend.

A smart attraction experience: Pricing strategy

The common experience

Difficulty in determining optimal dynamic price

The sales team is in charge of identifying optimal price to maximise revenue.

Currently, they set different prices for off-peak, peak and super-period periods. However, determining the optimal price is challenging and requires a huge amount of historical data to determine demand and seasonality.

A smart attraction experience

Stage 1 Foundation

Robotic Process Automation (RPA) can be used to scrape other attractions' websites and extract pricing into a table for easy reference, thereby reducing the amount of time needed by employees to collect information on pricing. RPA can also monitor pricing trends across different websites to help attractions gain an overview of the industry.

Stage 3 Intelligence

Capturing historical data of market demand and trends as well as competitors' pricing, a **dynamic pricing system** can suggest optimal prices. For example, to ensure a quality customer experience during the holiday season, ticket prices can be adjusted upwards based on a surge in demand, allowing the attraction to manage capacity limits while maximising revenue. Dynamic pricing can help to even out crowd capacity throughout the year, as price-sensitive customers will look for good deals to buy cheaper tickets during off-peak season. This will help to increase the attractions' capacity during less peak seasons.

A smart attraction experience: Targeting customers to upsell

The common experience

Difficulty in identifying optimal bundles or promotions to maximise revenue

The sales/revenue team is in charge of upselling more 'premium' tickets (e.g. season passes or express passes) and bundling products for cross selling. Dynamic bundling may be difficult to implement, due to limitations with the ticketing system. As the sales data is found across multiple sales channels (e.g. website, OTAs), the team manually consolidates all the data into an excel to determine the optimal product combination.

There is a lack of insight into the right product combination that will cater to customer needs, and the need to balance the competing demands of customers who prefer not to be burdened with additional products.

A smart attraction experience

Stage 3 Intelligence

Coupled with a **Customer Relationship Management (CRM) system**, the **dynamic pricing system** is able to suggest different pricing or ticket bundles with other products for different customer groups based on factors like nationality, age, demographics, socioeconomic background collected in past interactions on the attraction's owned pages.

An example of a cross selling opportunity may be: based on historical data, visitors of a certain demographic tend to purchase attraction tickets with food and beverage vouchers. To upsell to more guests of the same demographic, the dynamic pricing tool identifies the visitor demographic and provides an attractive ticket and food voucher bundle at the cart out page.

Upselling would likewise leverage visitor data to promote personalised offers. Based on past historical data that a guest frequently purchases tickets in pairs, the dynamic pricing system may encourage advance purchases for future visits by suggesting a 20% discount for a pair of express tickets. Thus, the attraction is now able to capture more revenue.

A smart attraction experience: Targeting customers to drive repeat visitorship (1 of 2)

The common experience

Lack of a single view of the customer due to fragmented data

As marketing data is captured across siloed systems (e.g. website sales, social media ad performance), there is no single view of the customer. Without a full view of the customer journey, it is challenging to identify touchpoints that best drive conversions. For example, customer details are derived only through online ticket purchase. With limited clarity of who their customers are, what they did, or how long they spent at the attraction site, there are few opportunities for follow up and reengagement.

Tedious process of personalising marketing communications

The attraction is less able to curate personalised and track its conversion rate to actual sales e.g. electronic direct mails (EDMs) clickthrough rate into actual ticket sales. For example, when attractions want to roll out monthly birthday promotions, they have to manually extract a mailing list from the ticketing system, and trigger the EDMs on different days of the months to their visitors.

This manual process is far from the hyper-personalisation marketers wish to achieve, including pushing relevant content, at the right touch points, with the right frequency.

A smart attraction experience

Stage 1 Foundation

With the **integration to social media channels and the website, a Customer Relationship Management (CRM) system** can also track direct interactions with their customer such as visits to the company website, subscription to newsletters, engagement with the attraction on social media platforms and use of promo codes to purchase tickets.

A **CRM** can be used to tailor marketing communications to specific segments of customers. For example, a guest that has previously visited the attraction but has not interacted with the attraction for more than three months could be labelled as ‘at risk’. A series of EDMs with personalised offers could be planned for the guest, where rules can be configured to trigger the next EDM in the series. This also allows the marketing team to attribute an EDM marketing effort to ticketing sales.

A **webform integrated with the CRM** can provide the cart abandonment function using trigger based journeys. When the guest fill up their details but did not complete their purchase, they can trigger a reminder email to them and offering them a small discount to incentivise them to purchase.

A smart attraction experience: Targeting customers to drive repeat visitorship (2 of 2)

The common experience

(continued from previous page)

A smart attraction experience

Stage 3 **Intelligence**

To further enrich the customer profile, a **customer data platform (CDP)** can be developed. A CDP goes beyond organising and managing customer-facing interactions to collecting behavioural data on how customers interact with the attraction. The CDP combines first-party data from separate databases using identifiers in a process called customer data integration. The unified customer profile created can be broken into traits and intent, and can be used across platforms (e.g. Facebook ads) to push personalised, real-time outbound messages. The CDP can also be enriched with third-party data such as public demographic data to improve personalisation.

The Journey

From the common experience to a smart attraction experience:

Sustainability

The use of technology solutions aims to create a smart attraction experience in Sustainability

Business processes	Energy Tracking and Management		Energy Optimisation	Waste Output Reduction	Renewable Energy Generation
	Tracking and Monitoring	Reporting	Optimisation	Reduction	Generation
Key challenges in the common experience	Manual energy consumption tracking Manual consolidation of data	Manual tabulation of carbon emissions	Manual control of appliances to reduce energy consumption	Manual waste level monitoring	Opportunity in energy regeneration technology
Technology solutions	 Energy tracking and monitoring system	 Emissions management system	 Internet of Things (IoT) technologies	 Smart waste bins	 Renewable energy

Outcomes

- Drive efficiency in monitoring and tracking energy consumption, carbon emissions and waste
- Build a sustainable attraction and work towards achieving sustainability certifications

The smart attraction experience: Energy tracking and management (1 of 2)

The common experience

Manual consumption tracking and consolidation of data
To track the attraction's energy usage of electricity and gas, staff have to manually record the readings of its electricity and water meters into an excel sheet. They also then need to verify it against its electricity and utilities bills from the Public Utilities Board (PUB). This data is then used manually generate graphs, plot any trends and make comparisons to previous months.

Insufficient granularity on energy consumption data
Given that the meter only gives the overall energy usage, the data is not granular enough to be broken down by area or time to identify consumption spikes and take prompt action.

A smart attraction experience

An energy tracking and monitoring system can be implemented and integrated with the tracking meters and data loggers. The system is able to measure the attractions' energy consumption and show energy consumption trends (e.g. high-energy consumption areas to reduce its usage). Regular reporting and identification of energy saving opportunities allows staff to divert their attention from data logging and comparison to pre-emptive actions to reduce energy usage. Immediate alerts on consumption spikes and abnormalities prompt staff to take corrective measures.

The smart attraction experience: Energy tracking and management (2 of 2)

The common experience

Manual tabulation of carbon emissions

The sustainability team may endeavor to tabulate their carbon footprint to attain certifications (e.g. Green Mark), for annual impact statement reporting, or be mandated to do so as a publicly listed company. This entails detailing their energy consumption activities and recording their carbon and waste footprint. Without a digital tool, sustainability teams face the tedious process of collecting data from their suppliers and energy bills, collating and inputting data into excel sheets, then converting and calculating carbon footprint.

A smart attraction experience

An **emissions management system** can aid in automatically tracking and report emissions, such as carbon and greenhouse gas emissions on a singular platform. It also helps the attraction to benchmark its current performance to key performance indicators (KPIs), and reports the data using an easy-to-understand visualisation (e.g. line graphs). Scenario planning built into the software enables the attraction to develop plans to reduce their emissions over time.

A smart attraction experience: Energy optimisation

The common experience

Manual control of appliances to reduce energy consumption

Staff have to manually ensure that all electrical appliances are switched off when not in use, and have to ensure that master switches are turned off at the end of the work day.

Without a view of the existing consumption patterns of the appliances, attractions are unable to identify areas of high energy usage to take action on.

A smart attraction experience

Implementing **Internet of Things (IoT) technologies, integrated with energy tracking submeters and utilities detection sensors,** help to mitigate excess energy consumption.

Examples of IoT sensors to control energy consumption include smart lighting with motion sensor, which can turn on lights upon detecting movement, and temperature sensors to maintain air-conditioning at a certain temperature. Hence, staff are not required to regularly check and switch off unused appliances.

The sensors also provide real-time readings of energy consumption, detecting inefficiencies and alerting staff on potential areas of energy optimisations. Energy consumption tracking can aid in understanding usage patterns and trends, which the attraction can analyse to understand usage in individual appliance types and implement cost-savings measures to reduce its energy usage.

A smart attraction experience: Waste output reduction

The common experience

Manual waste level monitoring

At present, most attractions have traditional waste bins that need to be regularly checked and cleared by waste management teams. Waste volume tracking has to be done manually, where staff have to weigh waste and input data collected into computer systems for any form of insight gathering.

Attraction staff thus have to monitor waste levels manually and proactively clear waste from waste bins, to avoid the issue of litter overflowing during periods of higher visitor volume, which can attract potential pests and be unsightly to visitors.

A smart attraction experience

Smart waste bins have larger capacity than regular waste bins, as they can compact trash into smaller sizes. The bins also have a notification feature that informs the waste management team when they are at full capacity, so that they can be cleared.

The capacity sensors and notification features can provide the attraction with raw data on waste management, which the attraction can analyse with a **data analytics dashboard,** enabling the attraction to better understand waste management needs based on utilisation rates, clearance rates and other such key factors. It can also help to optimise waste management route plans, so that it reduces the needs for regular rounds of checking and clearance.

With increased capacity and prompt clearance when at maximum capacity, attractions can ensure they provide a cleaner space for its guests, while optimising its manpower.

A smart attraction experience: Renewable energy generation

The common experience

Use of non-renewable energy

Attractions typically purchase electricity from the national grid, which is largely powered by natural gas combustion, a non-renewable method of electricity generation. Depending on the energy retailer they purchase from, attractions are bound to high electricity tariffs based on the market demand.

A smart attraction experience

Stage 3 Intelligence

A **renewable energy source, such as solar power** can reduce dependency on external electricity suppliers and deliver long-term cost reduction. Attractions have the option of a Power Purchase Agreement (PPA), where solar panels suppliers will set up a small plant on the attraction's premises for the attractions to pay for the electricity used, or the option to set up their own solar plant, that they can fully own and utilise in the future.

Beyond just being a source of clean energy, solar power can aid attractions in keeping in line with the SG Green Plan 2030 to reduce carbon emissions, which can boost their brand image.

04

Your Roadmap

Towards a smart attraction experience

15 technology solutions across three job functions were shortlisted based on their ability to address challenges most frequently raised by attractions, and the industry's keenness to adopt the technologies

Customer Service

Channel management system/ API integration with OTAs

Self-service Ticketing Kiosks

AI-enabled chatbots

Data analytics tool: Data analytics dashboard

CRM* for Customer Service

*Customer Relationship Management system (CRM)

Sales and Marketing

Workplace automation: Robotic Process Automation (RPA)

Dynamic pricing system

Data analytics tool: Smart analytics for social media

Customer Data Platform (CDP)

CRM* for Sales and Marketing

Sustainability

Renewable energy

Emissions management system

Smart waste bins

Energy tracking and monitoring system

IoT technologies

15 technology solutions were shortlisted based on their ability to address challenges raised by the industry and alignment to the objectives of the three stages...

Stage 1 – Foundation

Objectives

- Increase operational efficiency
- Reduce manual tasks
- Sustainability: Track and reduce cost, consumption and waste

Stage 2 – Insight

Objectives

- Consolidate data for analysis and allow users to make business decisions

Stage 3 – Intelligence

Objectives

- Aggregate data for advanced/ AI-enabled analytics
- Sustainability: Track emissions and explore renewable energy

	Stage 1 – Foundation	Stage 2 – Insight	Stage 3 – Intelligence
Customer Service	Channel management system/ API integration with OTAs Self-service Ticketing Kiosks CRM* for Customer Service	Data analytics tool: Data analytics dashboard AI-enabled chatbots	
Sales and Marketing	Workplace automation: Robotic Process Automation (RPA) CRM* for Sales and Marketing	Data analytics tool: Smart analytics for social media	Dynamic pricing system Customer Data Platform (CDP)
Sustainability	Smart waste bins Energy tracking and monitoring system IoT technologies Emissions management system		Renewable energy

*Customer Relationship Management system (CRM)

... prioritised by their relative value, ease of implementation, technical dependencies and implementation timeframes

Implementation timeline for technology solutions		Stage 1	Stage 2	Stage 3
Customer Service (CS)	Self-service ticketing kiosks	6 - 12		
	Channel management system/API integration with OTAs	6 - 12		
	Customer Relationship Management (CRM) for CS	6 - 12	6 - 12	
	AI-enabled chatbots	1 – 3*		3 - 6
	Data analytics dashboard		6 - 12	
Sales and Marketing (S&M)	Customer Relationship Management (CRM) for S&M	6 - 12	6 - 12	
	Customer Data Platform (CDP)			6 - 12
	Dynamic pricing system			> 12
	Smart analytics for social media		3 - 6	
	Robotic Process Automation (RPA) for manual tasks	3 - 6		
Sustainability	Energy tracking and monitoring system		> 12	
	IoT technologies		> 12	
	Emissions management system			6 - 12
	Renewable energy			6 - 12
	Smart waste bins		3 - 6	

*Basic chatbot

Legend

Estimated implementation time (months)

Pre-implementation activities**

**Note: Pre-implementation activities will vary based on the nature of the attraction and current maturity, hence the implementation timeline is estimated and excludes pre-implementation activities.

Three key considerations for implementation before you begin your journey

Before selecting a technology to adopt, keep in mind these three key considerations to future-proof and set realistic expectations on benefit realisation timelines.

01 Review your existing technology stack and start with the end in mind

To reap the full benefits of a holistic technology stack, start with your end-state in mind and determine which systems must be integrated to achieve your goals (e.g. data collection for decision making).

- Evaluate your existing technology stack on its effectiveness in reaching your goals, and upgrade from legacy systems.
- Prioritise integration requirements of core systems*
- Involve cyber specialists in technology selection early to minimise technology debt and ensure compatibility with your existing technology stack.

Source: KPMG Global Tech Report 2022

02 Consider your capacity in taking on multiple projects

Plan for a staggered implementation, using the phased timeline as a guide. Consider your staff's bandwidth in managing daily operations whilst taking on roles or the successful adoption of new systems. Important roles include:

- **Business Owner (BO):** Responsible for coming up with new requirements, and aligning with PO on the key business objectives. Usually belongs to the job function the technology is implemented for (e.g. customer service staff for chatbots).
- **Product Owner (PO):** Responsible for ensuring that the product achieves the desired business objectives. Usually belongs to the IT department.
- **Champion:** Responsible for facilitating change and encouraging staff to utilise the system.

03 Allocate time for pre-implementation activities

Prior to implementing the system, your attraction will need to conduct some pre-implementation activities, including but not limited to:

- ✓ Needs identification (use cases)
- ✓ Requirements gathering (technical and business)
- ✓ Tender release and response
- ✓ Negotiation
- ✓ Grant formalities
- ✓ Vendor finalisation
- ✓ Vendor mobilisation

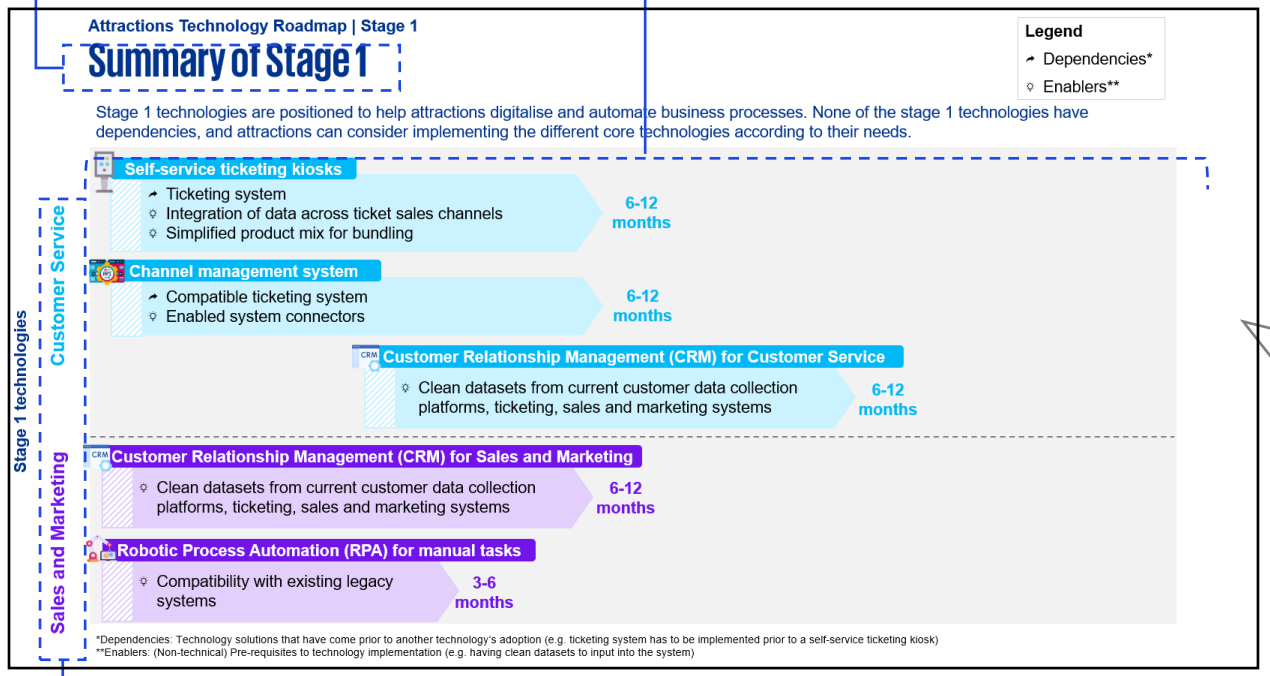
Time taken for these activities may vary depending on your attraction's needs.

**Core systems here refers to systems that most other systems will integrate with, like the ticketing system in the context of attractions*

How to read the roadmap summary slides

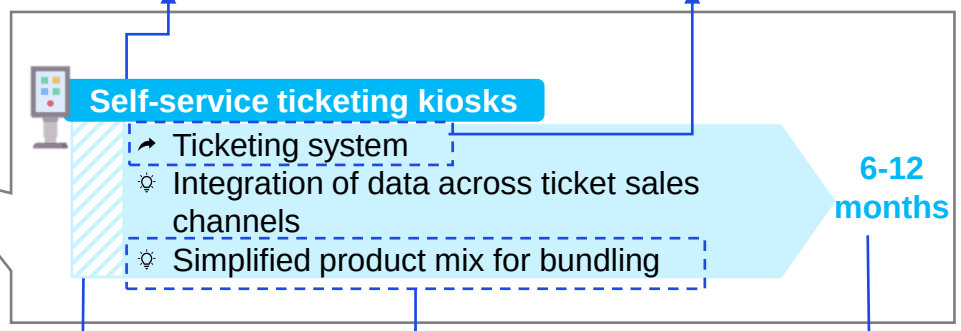
Stage of the technology transformation

Staggered implementation accounts for:
- Ability to achieve stage objectives
- Value and ease of implementation
- Dependencies between technologies



Technology proposed to be implemented in this stage

Dependencies (denoted by arrow):
Technology solutions that have to come prior to another technology's adoption (e.g. ticketing system has to be implemented prior to a self-service ticketing kiosk).
Note: Technologies that have no identified dependencies will not feature this arrow.



Enablers (denoted by lightbulb):
Non-technical pre-requisites to technology implementation (e.g. having clean datasets to input into the system)

Estimated implementation timeline

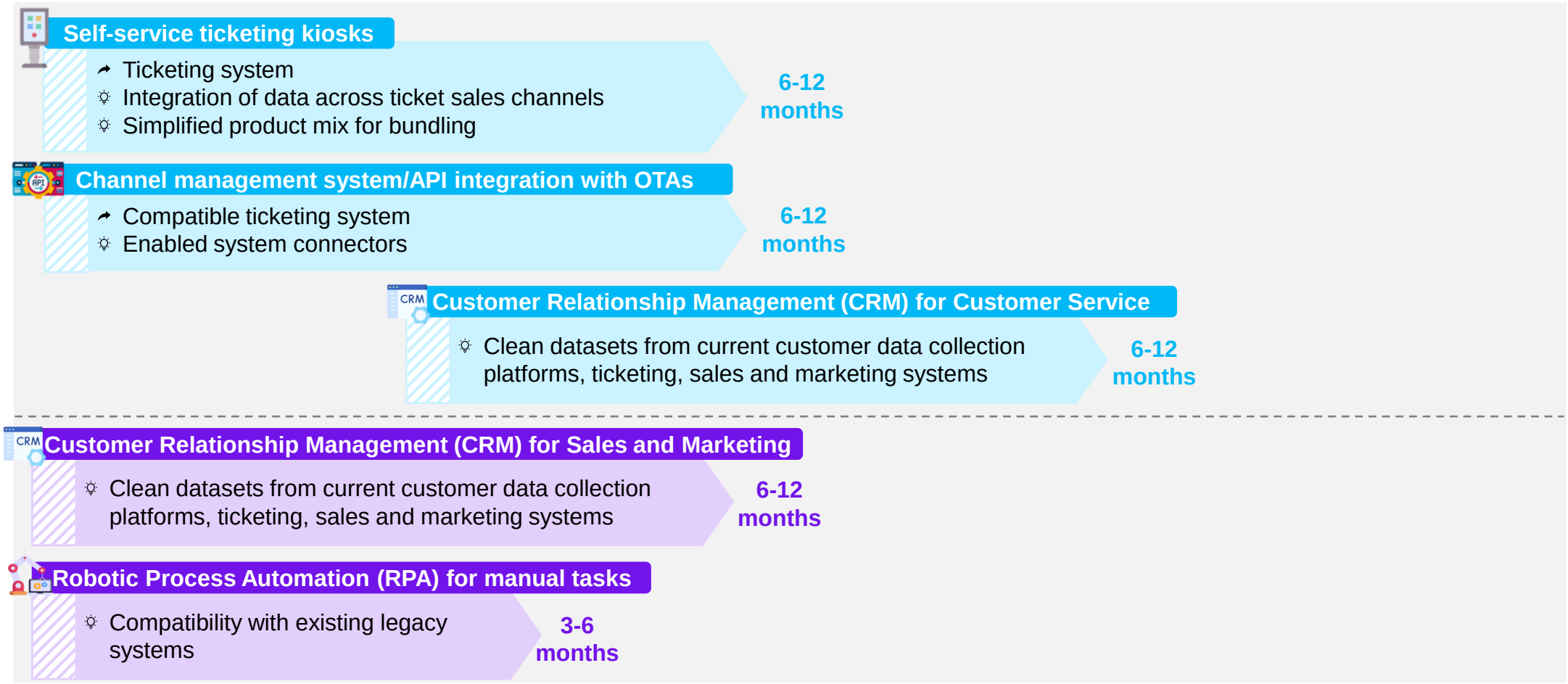
Job functions
- Customer service technologies in blue
- Sales and marketing technologies in purple
- Sustainability technologies in green

Shaded box:
Indicates pre-implementation process, including tender and procurement, grant formalities, vendor selection

Summary of Stage 1

Legend
- Dependencies*
- Enablers**

Stage 1 technologies are positioned to help attractions digitalise and automate business processes. None of the stage 1 technologies have dependencies, and attractions can consider implementing the different core technologies according to their needs.



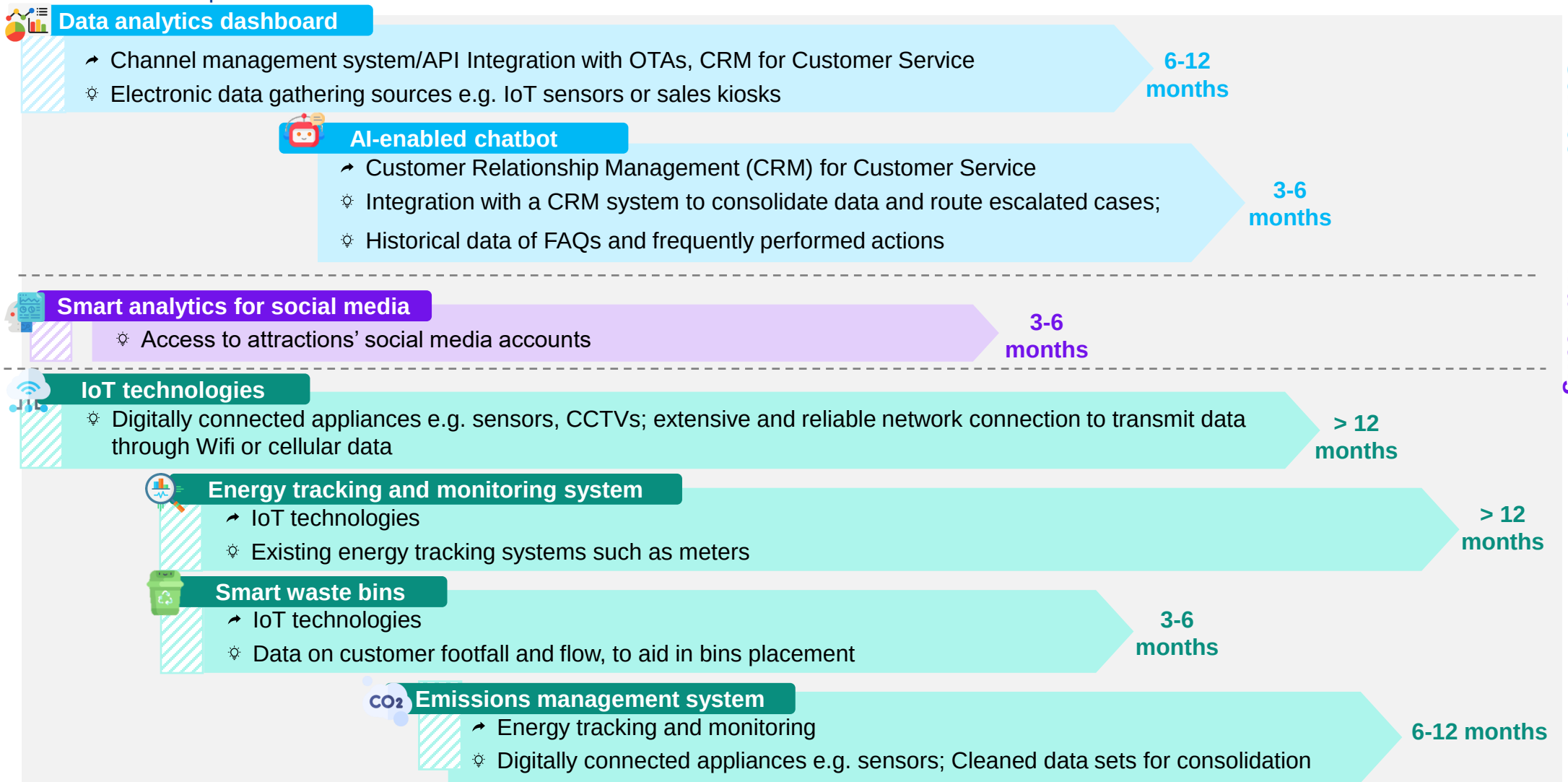
*Dependencies: Technology solutions that have come prior to another technology's adoption (e.g. ticketing system has to be implemented prior to a self-service ticketing kiosk)
**Enablers: (Non-technical) Pre-requisites to technology implementation (e.g. having clean datasets to input into the system)

Executive Summary
Overview
The Journey
Your Roadmap
Technologies
Getting Started

Summary of Stage 1/ 2

Stage 1/2 technologies are focused on helping attractions enhance digital capabilities and gain insights into business and sustainability-related operations, customers' behaviour. IoT technologies should be implemented prior to energy tracking and monitoring technology and smart waste bins due to the dependencies involved.

Legend
- Dependencies*
- Enablers**



*Dependencies: Technology solutions that have come prior to another technology's adoption (e.g. ticketing system has to be implemented prior to a self-service ticketing kiosk)
**Enablers: (Non-technical) Pre-requisites to technology implementation (e.g. having clean datasets to input into the system)

Summary of Stage 3

Legend
- Dependencies*
- Enablers**

Stage 3 technologies are focused on leveraging intelligence for smart and predictive services and to further build a sustainable attraction business. All the technologies have dependencies and are proposed to be implemented in the final stage of the roadmap.

Customer Data Platform (CDP) — 6-12 months
- CRM for Sales, Marketing, Customer Service
- Data gathering sources such as CRM systems, data analytics systems, email and feedback surveys

Dynamic pricing system — 6-12 months
- CRM for Sales, Marketing, Customer Service
- High volume and high quality of historical and real time data, e.g. customer patterns, web traffic and market trends, for best reading of customer price preferences

Renewable energy — 6-12 months
- Availability of physical space for installation

Sales and Marketing

Sustainability

Stage 3 technologies

*Dependencies: Technology solutions that have come prior to another technology's adoption (e.g. ticketing system has to be implemented prior to a self-service ticketing kiosk)
**Enablers: (Non-technical) Pre-requisites to technology implementation (e.g. having clean datasets to input into the system)

05

Technologies

Descriptions of Roadmap technologies

There are five prominent considerations to adoption which may influence attractions' willingness and ability to adopt technology (1 of 2)

We have proposed a few strategies that attractions can employ to integrate these considerations into their adoption plan and embark on their journey.

01 Maximise manpower opportunities

Attractions can consider how best to tackle manpower constraints by exploring opportunities to maximise existing manpower.

- Outsource training of employees and management of technology by vendors
- Create a cross-departmental digitalisation team to handle all digital adoption projects and accelerate the deployment of the digital transformation strategy across the attraction
- Explore reaching out to external technical experts, e.g. CTO-as-a-service* by IMDA provides SMEs with digital consultants and access to cost-effective digital solutions

02 Encourage a culture of change through Change Management

Implementation of a new technology or new digital strategy would open up new ways of doing business, where new skills and a flexible mindset are required. It is crucial for staff members to see the value of technology in improving their productivity and ultimately being an aid, not a hindrance, to their day-to-day activities.

- Seek training and knowledge-sharing opportunities from vendors and external training courses to upskill staff and provide the necessary support
- Measure the uptake of the technology across the job functions to evaluate staff's usage of the technology

03 Awareness of PDPA laws

Protecting staff and customers information is key. When implementing new technologies, it is important to...

- Understand the Personal Data Protection Act (PDPA) laws and regulations on collection of customer data
- Consider and evaluate the different types of data to collect from customers and if it abides by the law

Chief Technology Officer-as-a-Service

Source: IMDA

There are five prominent considerations to adoption which may influence attractions' willingness and ability to adopt technology (2 of 2)

We have proposed a few strategies that attractions can employ to integrate these considerations into their adoption plan and embark on their journey.

04 Emphasis on Data Security

Attractions must strengthen cybersecurity measures to protect staff and customers, protect against cyberattacks as well as to gain the confidence in adopting more technologies in the future.

- Review existing cybersecurity processes and protocols in place
- Identify major internal challenges to achieving cybersecurity goals
- Consider potential risks and threats and how best to protect the attraction against them
- Source for cybersecurity products and services best suited for the technology adopted
- Speak to vendors about cybersecurity concerns

05 Benchmark energy consumption levels

Attractions who are exploring sustainability technologies can tap on different resources to benchmark against their energy consumption levels Benchmarking can help attractions craft realistic sustainability targets and goals, and aspire towards becoming more sustainable in its operations.

Some resources are:

- Peer attractions' reports – local and international attractions
- Building and Construction Authority (BCA) annual Building Energy reports

Sustainability

The next section covers the following key technologies for each of the three job functions

Customer Service

Channel management system/ API integration with OTAs

Self-service Ticketing Kiosks

AI-enabled chatbots

Data analytics tool: Data analytics dashboard

CRM* for Customer Service

Sales and Marketing

Workplace automation: Robotic Process Automation (RPA)

Dynamic pricing system

Data analytics tool: Smart analytics for social media

Customer Data Platform (CDP)

CRM* for Sales and Marketing

Sustainability

Renewable energy

Emissions management system

Smart waste bins

Energy tracking and monitoring system

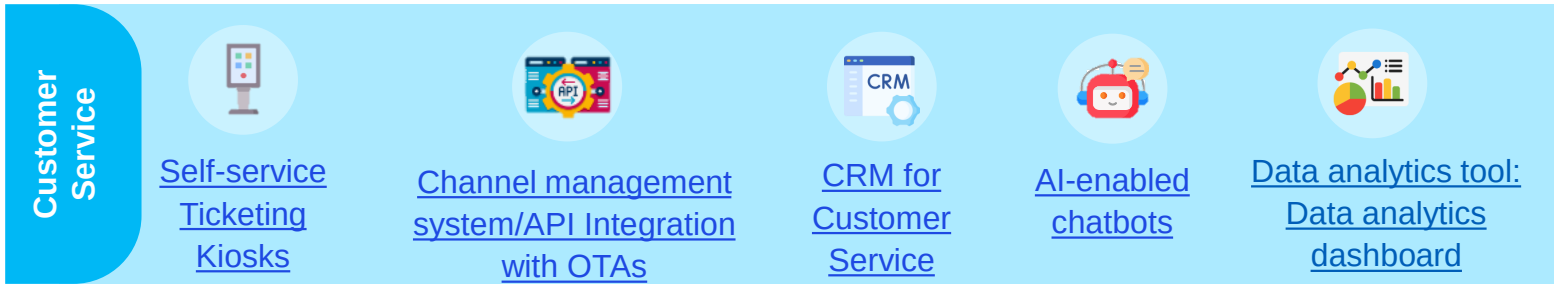
IoT technologies

*Customer Relationship Management system (CRM)

Technologies

Customer Service

This section covers the following technologies for the customer service job function



*Customer Relationship Management system (CRM)

Customer Service

Self-service Ticketing Kiosks (1 of 3)

Challenge: **Limited manpower to relieve crowds and queues**

What is a self-service ticketing kiosk?

Self-service ticketing kiosks are stationed at the entrance of attractions and allow visitors to purchase tickets on-site without the need to queue at the ticketing counter and with little to no assistance required from staff.

Note: Besides implementing a physical kiosk, attractions can explore other ways to encourage visitors to self-purchase, e.g. on a mobile application (see: considerations for adoption).

Consider a self-service ticketing kiosk if...

- Your attraction has high volume of on-site ticket sales for walk-in customers
- Your attraction experiences a lack of manpower for ticket sales

Stakeholders	Use cases	Benefits
Management and C-suite level	Manpower optimisation	✓ Increases availability of manpower that can be deployed to other areas that require more assistance or more personal touch ✓ Improve customer experience by reducing wait times
	Enhanced guest experience	
Employees	Clear queues faster by diverting visitors to the self-ticketing kiosks	✓ Reduces the occurrences of bottlenecks and crowds forming ✓ More control over crowd and queue management ✓ Streamline operations for counter staff to focus on complex queries or safety briefings ✓ Upsell product bundles easily
	Self-help service for redemption and verification of pre-purchased tickets	
	Self-help service for purchasing different product mix of tickets and other add-ons, e.g. merchandise	

Customer Service

Self-service Ticketing Kiosks (2 of 3)

Challenge: **Limited manpower to relieve crowds and queues**

Features of self-service ticketing kiosk*

Optional

Ticket transaction	Perform end-to-end ticket transaction process for on-site ticket purchase
Payment	Ability to accept multiple digital payment methods and/or accept cash payment
Integration with ticketing system	Integrate with ticketing system to offer the same standardised ticketing options as other sales channels
Ticket verification	Ability to verify pre-purchased tickets, e.g. barcode or QR scanner
Print tickets	Ability to print tickets on-site and send as an e-ticket via email
E-tickets	Ability to provide e-ticket to visitors
Multi-language	Ability to support multiple languages
Customer service support	Ability to direct visitors to seek immediate assistance from customer service
Offer product mix	Ability to provide a simplified product mix for upselling and cross-selling
Waiver form	Provides a Waiver of Indemnity form for visitors to sign
Verification of visitors	Ability to conduct local or foreign visitor verification, e.g. barcode/QR scanner

**Based on common features across systems*

Customer Service

Self-service Ticketing Kiosks (3 of 3)

Challenge: **Limited manpower to relieve crowds and queues**

Considerations for adoption

- **Space constraints and queue management –** Based on the availability of space at the attraction site, consider the placement, positioning and number of kiosks to adopt so as to avoid long queues from disrupting the experience.
- **Long-term maintenance costs –** Attractions should keep in mind regular maintenance costs (including security updates) that will be incurred, and explore vendors that can provide cost-effective packages according to attractions' needs.
- **Importance of customer-friendly and intuitive interface –** To maximise the usage of the kiosk by visitors, the user interface design to be simple and easy for them to understand. Pricing display and inventory management would be particularly important for kiosks with merchandising capabilities.
- **Involve stakeholders across relevant teams –** As the functions of the ticketing kiosk are relevant for both the Customer Service (CS) and Sales and Marketing (S&M) teams, the kiosks can be integrated with the systems and processes of the teams, such as the CRM system for the CS team and the virtual ticketing software for the S&M team.

(see next page)

Enablers

- Integration of data across ticket sales channels to provide a consolidated view
- Create a simplified product mix for bundling

Possible integrations

- Ticketing system
- Payment providers
- Travel trade partners

Roles & accountabilities

Business Owner: Customer Service

Product Owner: IT Team

Champion: Customer Service, Sales and Marketing

Myth: "Having self-service ticketing kiosks reduces my opportunities to interact with customers"

It is undeniable that part of the customers' experience is created by interactions with service staff. Conversely, having self-service ticketing kiosks allows for staff to be deployed to other higher-value areas, e.g. help desk, gantry points and increase quality interactions with customers.

Self-service Ticketing Kiosks (3 of 3)

Challenge: **Limited manpower to relieve crowds and queues**

Considerations for adoption

(continued from previous page)

- **Evaluate demographic of target audience –** Consider the demographic of visitors who will use the kiosk to evaluate the feasibility and effectiveness of the kiosk adoption, e.g. age of visitors, level of digital-savviness.
- **Alternative forms of self-service ticketing –** Besides implementing a physical kiosk, attractions can explore other ways to encourage visitors to self-purchase, e.g. on a mobile application. Attractions to compare the cost of maintenance and development, as well as the types of guests they receive (i.e. recurring or one-off visits) to decide on the best self-service mechanism.
- **Alignment with admission process and systems** – Identify and source for kiosks with capabilities that are aligned with attractions' admission process and systems. For example, attractions that rely on wristbands can adopt kiosks that can directly issue wristbands and are connected to the turnstiles for a seamless admission process.

Enablers

- Integration of data across ticket sales channels to provide a consolidated view
- Create a simplified product mix for bundling

Possible integrations

- Ticketing system
- Payment providers
- Travel trade partners

Roles & accountabilities

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Case study: Self-service Ticketing Kiosk (1 of 2)

Featured attraction: Singapore Flyer

The Challenge

The attraction initially used a manual ticketing process that required up to three front-end and two back-end staff to run daily operations.

As the attraction's operations are subject to weather conditions, guests prefer buying tickets onsite rather than online to ensure certainty of their visit. However, the attraction was faced with a manpower shortage in operating the ticketing counters, especially during peak periods.

As guests had the option to use cash, this led to additional resource effort to collect cash payments, and the need for a supervisor to oversee treasury and cash flow collection along with arranging daily deposits to the bank.

While the attraction recognised the need to continue operating manned ticket counters for guests with enquiries or those opting for cash payments, it needed to provide a self-service option to streamline its ticketing operations and be less affected by a manpower shortage.

The Solution

Jointly led by the IT and operations team, the attraction deployed the Gateway Galaxy Ticketing system software (back-end ticketing system) and hardware (computer and physical kiosks) in a span of nine months. The system handles ticketing front-end and back-end operations, online store, kiosks and admission control.

Implementing ticketing kiosks allowed the attraction to save approximately two staff from having to operate the ticket counter and instead deploying them to high-touch interactions such as greeting guests at the admission area, verifying tickets and performing safety and bag checks.

Additionally, the attraction incorporated visitorship data collection in the ticketing process. This includes asking questions to better understand customers' demographics and behaviour including gender, residency and email address.

The attraction aims to collate sufficient data by incorporating data from channel partners (such as travel trade partners) to develop predictive models that can understand individual customer behaviour and guide decision-making.

Case study: Self-service Ticketing Kiosk (2 of 2)

Featured attraction: Singapore Flyer

Considerations

- It does not take implementing a new system to consider the opportunities for enhanced data collection – as the attraction recognises the need for enhanced data analytics, it may look to collect beyond transactional data. At the point of ticket purchase, customers can be prompted to add their demographic information. This is aimed at developing a data analytics capability for the attraction to understand who are buying the tickets, what purchases are being made and the guests' spending behaviour.
- There is a need to continuously monitor if the data collected is meaningful – e.g. if providing email addresses during the purchase is made mandatory, customers may consistently provide false data. The attraction should only gather data that can lead to actionable change.

Pitfalls to avoid

- Anticipate unforeseen disruptions and allow sufficient time for on-site testing and commissioning to enable a smooth launch. For instance, the attraction experienced disruptions during COVID and rushed to go-live to meet their funding timeline. This resulted in hiccups that could be avoided had they performed testing and commissioning.
- Align on expectations for ways of working with the system vendor to manage project timelines – project duration could be shorter if ticketing system vendor was more flexible and understanding. Singapore Flyer worked with Galaxy Gateway through their local representative, and experienced long turnaround times for simple issues and hiccups in communications, although there were no major challenges in the project.

Results

- An estimated **10% savings in operating costs –** staff (2 personnel per day or **40% of the ticketing crew** before the implementation of the kiosks) can be redeployed to high-touch interactions.
- An estimated **50% take-up rate** by visitors opting to buy tickets from the kiosk per day, reducing the load on the ticket counter.
- An estimated **5% increase in guest satisfaction** score due to a shorter queue time.
- **Meeting customer expectations** by providing multilingual ticketing kiosks to cater to international visitors.
- Frequency of cash collection and deposit cycle to the bank is reduced from **daily to once a week**.
- **Capturing user data upfront** to enable robust data analysis once their data model development is complete.
- The payback period is approximately **three years.**

Customer Service

Channel management system/ API Integration with Online Travel Agents (OTAs) (1 of 3)

Challenge: **Manual process of ensuring tickets sold through third parties are correctly redeemed**

What is Channel management system/API integration with OTAs?

Building API connections between attractions' ticketing system and Online Travel Agents (OTA) or leveraging a channel management system with existing integrations with OTAs allow attractions to automatically update their ticketing information (e.g. price, new product bundles), give instant confirmation once a booking on the OTA website is made, and have their ticketing inventory updated in real time.

Consider Channel management system/API integration with OTAs if...

- Your attraction consistently has spare ticket capacity
- Your attraction would like more avenues to reach potential visitors

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Sale of tickets on OTAs are directly updated in the attractions' ticketing system	✓ Increase customer satisfaction through seamless bookings ✓ Increase revenue through new channels to reach customers ✓ Consolidated report of tickets booked to gain better insights on how to improve ticketing sales ✓ Enables real time view of ticket sales and inventory stock ✓ Additional opportunity for cross product bundling
	Accurate availability, pricing information and instant confirmation for customer bookings	
 **Employees**	Customers can access attractions with tickets bought from OTAs, thus removing the need to redeem tickets at ticketing counter	✓ Less manpower required for onsite ticket verification, freeing up time to focus on other customer service related matters ✓ Improved understanding of customer sentiment ✓ Enables attraction to make necessary changes and improvements based on increased customer feedback
	Aggregated feedback is consolidated and provided to attractions	

Channel management system/ API Integration with Online Travel Agents (OTAs) (2 of 3)

Challenge: **Manual process of ensuring tickets sold through third parties are correctly redeemed**

Considerations for adoption (for API integration with OTAs)

- **Shortlist potential OTAs –** As there are multiple OTAs available, attractions can conduct an initial shortlisting of OTAs to contact based on factors such as OTAs' alignment with target market, % of commission rates and selection criteria (refer to the next point below).
- **Contact OTAs for API documentation –** Ensure that attraction meets the selection criteria of the chosen OTA for the API integration, as the OTA may reject the application if the criteria is not met. Selection criteria is dependent on individual OTA requirements. An example of selection criteria is the version of Transport Layer Security (TLS) protocol for data encryption.
- **Development Process –** Understand features and logic of the OTA channel. Some OTAs only require simple API documentations such as pricing and ticket availability, while others may require more complex documentations such as website content, messaging system and reviews of attraction.
- **Review capabilities of ticketing system –** Ensure that the ticketing system has the capabilities for API integration, especially for legacy systems.

Enablers

- Ticketing system – A suitable system that is integrable via API
- Enabled system connectors
- Create a simplified product mix for bundling

Possible integrations

- Ticketing system

Roles & accountabilities

Business Owner: Customer Service

Product Owner: IT Team

Champion: Customer Service, Sales and Marketing

Tip: Ensure that the API integration has robust security certificates

An integral part of customer service is ensuring customer data security. Ensure that the API integration services provided by the OTA have the necessary security certificates for HTTPS/SSL, CORS or cross-origin resource sharing, authentication such as JWTs (JSON Web Tokens), and authorization/scope. This ensures that there are no unwanted data leaks, and that your attraction is also compliant with the PDPA guidelines.

Customer Service

Channel management system/ API Integration with Online Travel Agents (OTAs) (3 of 3)

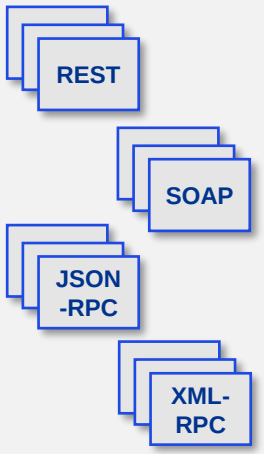
Challenge: **Manual process of ensuring tickets sold through third parties are correctly redeemed**

a **Process of building API Integration**

Identify API Provider

Identify the OTA to integrate with. The OTA will be the API provider.

Identify type of API used by OTA*



Obtain API documentation from provider

Information such as:

- ✓ How to access API
- ✓ API endpoints
- ✓ Request and response formats
- ✓ Authentication
- ✓ Error Handling

Develop Integration Code

Attraction calls API from the OTA

- Attraction needs to develop integration code to consume API from OTA

Integration Testing

OTA
↓
Attraction

Attraction needs to test the connection by sending requests to OTA via API and verifying responses

Go live

Real-time integration with OTA platforms is enabled – ticket purchases made through OTA sites are automatically deduct from the attraction's ticket inventory

** Depends on the range of integrations that chosen OTA provides*

Customer Service

Customer Relationship Management (CRM) System (1 of 3)

Challenge: **Manual reconciliation and analysis of feedback data | Manual sorting and routing of enquiries to the relevant departments**

What is CRM?

A CRM system aids in automation and management of the customer lifecycle. By capturing essential details of their customers, attractions can understand, manage and assist their customers in a more systematic and clear manner.

Consider a CRM software if...

- Your attraction wants to personalise communications to build rapport with potential customers
- Your attraction's customer engagement strategy emphasises retention and loyalty

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Omnichannel customer experience, which offers customer support through multiple channels e.g. emails, text messages and social media	✓ Increase customer satisfaction with attraction and its customer service ✓ Proactively understand customer sentiments ✓ Actively identify and address improvement areas for customer service
	Analyse customer behavior to understand how customers interact with the attraction and to understand any potential service gaps	
 **Employees**	Consolidate and categorise customer feedback from multiple channels	✓ Eliminate manual processing of customer feedback ✓ Increase efficiency in addressing customer concerns ✓ Improved tracking of KPIs such as first response times and resolution rates, and identification of trends such as types of categories of cases that repeatedly resurface ✓ Higher customer satisfaction due to reduced response times to customer queries
	Automated assignment of customer enquiry cases to the respective departments	
	Automated triggering of customer feedback forms and surveys	
	Provide a single view of all past customer interactions	

Customer Relationship Management (CRM) System (2 of 3)

Challenge: **Manual reconciliation and analysis of feedback data | Manual sorting and routing of enquiries to the relevant departments**

Features of CRM software*

Case routing and tracking	Ability to automatically route customer queries to the right department, and track progress of the case until it resolves
Generate customised reports	Ability to create reports using a desired criteria to slice and view customer feedback data and provide insights into customer satisfaction, customer service agent performance and other key metrics
Intuitive dashboard	Ability to create personalised dashboards based on individual department and employee's need, with focus on important KPIs and trends
Automate feedback gathering	Ability to automatically send out customer surveys and feedback forms, and collate feedback for analysis
Centralised knowledge base	Ability to store knowledge articles** for easy reference by employees and for self-service use by customers
Cloud-based sharing	Ability to share cases and reports across different departments for viewing and editing
Omnichannel capabilities	Ability to register queries received from multiple channels into one integrated application, and to respond to queries from all channels within the same application
Integrate customer data	Ability to standardise, organise and consolidate data from multiple sources into a single data base, which can be used for data analysis through filtering
Advanced reporting features	Features such as cross filters, joined reports, bucketing and history tracking
Omnichannel capabilities	Ability to integrate with other systems such as chatbots and smart analytics platforms to exchange information and simplify data entry

**Based on common features across systems*
***Knowledge articles: Documentation that answers frequently asked questions (FAQ) or provides instructions for solving a problem that customers commonly face.*

Customer Relationship Management (CRM) System (3 of 3)

Challenge: **Manual reconciliation and analysis of feedback data | Manual sorting and routing of enquiries to the relevant departments**

Considerations for adoption

- **Integration with current systems –** Pertinent for attractions to determine how well the new CRM system will integrate with current data collection and management systems in place, so as to ensure a smooth transition
- **Selecting fit-for-purpose CRM –** Attractions should evaluate the range of functionalities they require from their CRM system based on factors such as customer volume, budget and ease of integration with existing systems
- **Maintenance Support –** Attractions should select providers and consultants that can provide continuous support throughout the implementation and training period.

Possible integrations

- Data Analytics Dashboard
- Self-service kiosk – for service rating
- Customer feedback channels – Chatbots, Webform, Call Centres, Computer Telephony Integration
- Customer Data Platform (CDP)
- SingPass for local visitors
- Visit Singapore ID for foreign visitors
- CorpPass for local companies with corporate membership subscription with the attraction

Enablers

- Data harmonisation – Tagging a unique identifier such as phone number or email to link feedback to each customer
- Data storage and archival strategy
- Integration with the customer feedback channels in use by attraction
- Use of historical feedback data as knowledge base articles

Roles & accountabilities

Business Owner: Customer Service

Product Owner: IT Team

Champion: Customer Service, Sales and Marketing

Myth: "CRM is only for the sales team"

While the sales team can benefit immensely through reduced response times and improved sales techniques, the CRM system also provides improved communication and collaboration amongst various departments, which aids in improving your attraction's offerings, and in forecasting future changes and improvements necessary. CRM will streamline all customer interactions, including those by the marketing, customer service and other customer facing teams.

Case study: Customer Relationship Management (CRM) system (1 of 3)

Executive Summary
Overview
The Journey
Your Roadmap
Technologies
Getting Started

Featured attraction: Kiztopia

The Challenge

Initially, when customers made purchases online, they presented their e-tickets at the counter for the staff to check before allowing them to enter. The attraction would issue physical cards to keep track of those customers who were multi-visit or annual pass members.

The attraction also had various data sources such as their onsite POS system, website and ticketing platform. It was challenging to constantly extract and consolidate them for analysis and retargeting since the data was in different structures, formatting and access requirements.

Moreover, there were no customer insights since each data source had different fields and attributes making it difficult to map the data into a common format and subsequently upsell or convert first-time visitors into regulars. Though the attraction utilised Excel worksheets to keep track of sales and data, Excel was unable to provide a holistic view of the customer journey. It did not have the sophisticated data visualisation and analysis tools to incorporate customers' multiple touchpoints nor provide insights into identifying trends in customer interactions.

The Solution

The attraction implemented ActiveCampaign (AC) that acts as a CRM and marketing automation solution. The solution captures information on a customer's previous purchases, website visits, engagement with marketing emails and tracks sales opportunities (such as birthday parties) in a CRM pipeline. Customers are also issued with a virtual card designed to track their purchase and usage behaviour. This helps streamline data collection and tracking processes.

On a daily basis, AC's automation assists with email marketing activities such as sending follow up emails to customers who abandoned their carts and customers who visit the website without making a purchase, and sending a series of emails to nurture subscribers who have just registered for an account or signed up for the newsletter.

On a monthly basis, the data is used for customer segmentation - to build unique segments of contacts such as one-time customers, contacts who engaged with the email or website but have not made a purchase for email marketing campaigns. Additionally, data provided by AC is used to understand which email campaigns automations need to be optimised further. Periodically, they will remove disengaged contacts via AC's engagement data.

Case study: Customer Relationship Management (CRM) system (2 of 3)

Featured attraction: Kiztopia

Considerations

- To ensure the website is compatible with the CRM tool, attractions should:
  1) Choose a CRM system that is compatible with the website platform. For example, if your website is built on WordPress, you may want to consider a CRM system that has a WordPress plugin or integration.
  2) Use a CRM-friendly website design to ensure that customer data is captured and integrated seamlessly. This may involve using forms and landing pages that are optimised for data capture and are designed to integrate easily with your CRM system.
  3) Implement tracking and analytics tools such as Google Analytics so that you can track user behaviour on your website and capture valuable data that can be integrated with your CRM system.
- Allocate an internal champion that can liaise regularly between business users and the project consultants or technical team to ensure alignment with business needs, and guide internal users on the best way to get the most out of the system.

Results

- 20-30% time saved per week (estimated 20 hours per week) from not having to manually track contacts moving through the customer lifecycle.
- **Higher open-rates** in marketing emails compared to industry benchmarks. The industry's email open rates in 2021 was 22.06%. Before implementing the CRM system, the attraction's open rates were at 10%. After implementation, the value has increased to a range of 30-40%.
- Payback period of approximately **one year** – with emphasis on key non-quantitative benefits that build longevity into the business model: actively target clients to build **brand awareness**, ability to re-target and effectively **monetise client needs**.
- Ability to reach a **larger pool of customers on a regular basis** for marketing and promotions.
- The automated tasks at each stage and notifications to the operations manager ensure **no service delivery gaps.**
- Ability to **track and nurture a customer** throughout their lifecycle.

Case study: Customer Relationship Management (CRM) system (3 of 3)

Featured attraction: Kiztopia

Pitfalls to avoid

- Attractions with frequent online transactions, looking to launch or revamp their website should ideally complete the website rollout before implementing a CRM and marketing automation solution as modern CRM and marketing automation solutions for ecommerce are highly integrated with the website. Delays in the website rollout would cause delays in the implementation of the CRM solution.
- Failure to plan ahead: Given that there are several systems and people involved in the transformation it is critical to have a detailed plan on each phase of the implementation plan and the dependencies of each rollout to the next. Without such planning, this can lead to major delays in the rollout.
- Failure to communicate: Communication across internal and external teams are critical as one change can have impact across several departments. Attractions must also think of communication to their customers as they plan the incremental changes.
- Customer Data and Privacy: As customer data is collected, attractions must be sensitive around the PDPA rules and have waivers or disclaimers in place. Attractions also need to consider customer data storage and have a robust cyber security plan in place.

Customer Service

AI-enabled Chatbot (1 of 3)

Challenge: **Manual response via email or call to simple enquiries**

What are AI-enabled Chatbots?

An AI-enabled Chatbot is a virtual robot designed to interact with customers and answer their queries online. By learning through multiple interactions, the chatbot uses natural language processing semantics to predict the intent of the user, so as to understand the context of the question. It can carry conversations over a chat, without the requirement of a live agent. With 24/7 virtual availability, attractions can provide their customers with service beyond their set office hours.

Consider one of these chatbots if...

Basic	Your attraction wants to minimise reliance on staff for answering standard enquiries	Your attraction has few example conversations
AI-enabled	Your attraction wants to minimise reliance on staff for answering most enquiries	Your attraction has a large volume of example conversations

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Handle all standard online queries	✓ Reduce the number of live chat agents required, and can redeploy them to other areas ✓ Increase customer satisfaction by reducing response times ✓ Speed up purchasing process and increase conversion rates ✓ Harness product upsell and cross sell opportunities
	Identify trends to predict customers' queries and address commonly asked questions about the attractions	
	Propose suitable products based on customer profile and queries	
 **Employees**	Escalate queries to human agents only when the chatbot is unable to reach a resolution	✓ Channel employees' time towards customers with more specific and urgent needs
	Set up standardised conversational flow to address specific queries in the chat, e.g. how to purchase a ticket through the chat function	
	Craft frequently asked questions (FAQs) based on queries from the chatbots	

Customer Service

AI-enabled Chatbot (2 of 3)

Challenge: **Manual response via email or call to simple enquiries**

Features of AI-enabled chatbot*

Self-sustainable	Ability to resolve majority of queries within chat, with human agent intervention only required for niche cases
Machine-learning	Ability to detect synonyms and phrases, learn and improve its responses over time
Failed queries processing	Ability to escalate queries that it cannot answer to human agents
Third party data integration	Ability to integrate with CRM system and Data Analytics dashboard for understanding and analysis of customer trends
FAQ support	Provides drop down menu of frequent queries
Emotional Intelligence	Ability to use Natural-language Processing (NLP) and Natural-language Understanding (NLU) to understand context and emotions, so that it can address concerns in appropriate language and tone
Multilingual	Ability to support multiple languages
Sync with customer profiles	Ability to remember communication patterns based on individual profiles if customers are identified

**Based on common features across systems*

Customer Service

AI-enabled Chatbot (3 of 3)

Challenge: **Manual response via email or call to simple enquiries**

Considerations for adoption

- **PDPA Compliance –** Ensure that any personal data shared over the chatbot is properly secured and disposed of when no longer required
- **Extensive testing of chatbot required –** Necessary to ensure AI-enabled chatbot has a minimal level of accuracy in its responses before launching
- **Linking with CRM and CDP system –** To access larger amounts of customer data and retrieve details specific to individual customers (e.g. case status)
- **Linking to customer accounts –** If attraction has any form of membership account, it is prudent to link to the AI chatbot through API for easy log in through the query process, instead of redirecting the customer to log in on a new webpage
- **Selection of channel for installation –** Explore and select the best-suited channel (e.g. website, Facebook, WhatsApp) for installation by considering factors such as top customer digital touchpoints
- **Handoff to human agent –** Queries pertaining to more sensitive topics such as safety can be redirected to human agents for proper handling. Limitations in the chatbot's ability to address complex queries and provide accurate multilingual translations may require human intervention to address any issues as soon as possible. The AI-enabled chatbot can be trained to detect keywords and sentiments to ensure such queries are properly handed off.

Enablers

- Integration with a Customer Relationship Management (CRM) system, to consolidate data and route escalated cases
- Historical data of frequently asked questions and frequent responses

Possible integrations

- Integration with systems across marketing, sales and IT, e.g. CRM, Customer Data Platform (CDP)
- API integration with a Secured Client Area (i.e. membership account) or other password protected areas of attraction

Roles & accountabilities

Business Owner: Customer Service
Product Owner: IT Team
Champion: Customer Service

Tip: Personalise your Chatbot

Modify and create a chatbot that is unique and aligns with your brand personality, so as to increase the personal touch and connection with your customer. You can create a name, avatar and more to give your chatbot a more life-like feel, make the interaction more personable and increase your customers' satisfaction.

Case study: AI-enabled chatbot (1 of 3)

Featured attraction: Mandai Wildlife Group

The Challenge

Visitors can leverage on various channels to look for information about the attraction. However, if they are looking for a specific information regarding an animal, for example, they might not receive the right search results if they are searching in the wrong park. For urgent requests, visitors could send direct messages through social media.

Customer service staff had to handle many emails and calls regarding simple queries such as the weather, ticket costs and promotions, although the information was readily available on the website. Answering these enquiries took up manhours, and the Contact Centre team had to work overtime to address each query, of a repetitive nature.

In particular, many calls were regarding change of ticket date, which was not available unless there was a health reason (or Covid-related exigency). Some of the key announcements regarding these policies were not immediately clear to the guests, although measures like using their phone's interactive voice response (IVR) to play a recording of important announcements, and making the same message available on their website were in place.

The Solution

The attraction collated data from listening to 150 phone calls to identify the top questions that were coming through as enquiries. Thereafter, a conversation flow was drawn out to map how guests typically ask questions on the phone. As more data came in, the chatbot was further trained to answer questions and recognise intents that were going unanswered.

The chatbot is currently available on their website with plans to introduce it into their app. They continue to track the utilisation of the chatbot and have started to link it to a live chat function.

The implementation of the first iteration of the chatbot took six months and was championed by the Guest Experience team.

Case study: AI-enabled chatbot (2 of 3)

Featured attraction: Mandai Wildlife Group

Considerations

- Prior to implementation, research on the usefulness of chatbots in the attraction industry in terms of:
  - How customers prefer to contact service providers
  - What customers typically use a chatbot for
- Explore the means to purchase a better solution at the time of selection of vendor. Some key considerations for selection would be: budget, capability, ability to co-create and develop a product to suit attraction-specific needs rather than implementation of a standard off-the-self product, previous implementations in similar industry, depth and scale of AI development
- Have a team that shows willingness to learn and adopt the technology, to ensure that the system will be updated. Staff must undergo training by the chatbot vendor on how to use the administrative portal to maintain content which requires them to pick up some basic programming knowledge– e.g. conditional logic and “if-else” flows. As the portal with a graphical user interface does not require complex coding, it makes it easier to pick up this new skillset.
- Product owners need to have a clear understanding of the functionality of the technology and partner with someone who can enhance its capabilities further.
- Ability to capture quantifiable results to prove the success of the implementation
- During implementation of the chatbot, clearly define the purpose and goals – whether it is to answer enquiries, facilitate ticketing or otherwise.
- If the attraction has a website, do ensure seamless integration of the chatbot with the website, with clear call-to-actions that prompt users to engage with it.
- Integration of multiple languages in the chatbot is an ideal functionality for a chatbot. However, attractions cannot rely on using simple translations alone. It needs to be translated in the way that is natural for the native speaker of the language, so as to avoid any mistranslations.

Case study: AI-enabled chatbot (3 of 3)

Featured attraction: Mandai Wildlife Group

Results

- Before January 2022, calls and emails were the preferred mode of engagement. Since then, chatbot sessions have begun to overtake calls and emails, showing that **more guests are beginning to prefer to use the chatbot:** the attraction observed a **243% increase in chats** with a **49% decrease in call volumes** and **48% decrease in email enquiries**, when comparing a six-month period against the preceding period.
- Introduction of the change date/time request e-form available on the chatbot helped in reducing the calls for the same purpose.
- Additional training of the chatbot to address unanswered intents in 2022, resulted in a **decrease of unanswered intents over time**.
- **Existing staff are able to use their time more meaningfully to attend to more complex enquiries and feedback**, instead of being inundated with simple enquiries that can now be easily answered by the chatbot.

Pitfalls to avoid

- Identify and address any business processes which need to be changed before the chatbot can help, e.g. revalidation of ticket, change of date of visit.
- Align on the capabilities of the technology prior to implementation to understand effort required in maintaining system e.g. extent of ability to learn from queries input into chatbot (Mandai noted that there is still a need to input various intents and responses).

Data Analytics Dashboard for customer service (1 of 3)

Challenge: **Manual reconciliation and analysis of ticketing data to drive meaningful insight**

What is a data analytics dashboard?

A data analytics dashboard is a visual display of key data and metrics. It enables the user to monitor customer preferences and behaviours by linking to various data-sources, such as the Customer Relationship Management (CRM) system, feedback and ticketing systems, for in depth analysis. The dashboard can also allow users to monitor KPIs, aiding the identification of problem areas.

Consider a data analytics dashboard if...

- Your attraction's reports are being manually updated and analytics are conducted on an ad-hoc basis

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Perform analysis of attraction's individual exhibits or areas, e.g. art installations through customer response and feedback	✓ Enables informed decision making for customer service strategies such as manpower allocation ✓ Increased visibility to customers' journey ✓ Quicker identification of shortcomings and success factors in customer service ✓ Highlight areas where there is a potential service gap to be closed in the customer journey ✓ Highlight areas that can be further optimised through technology automation
	Analyse customer behavior and gain insights into customers' interaction with the attraction and customer-service processes, e.g. interaction with chatbots	
	Comprehensive overview of customer satisfaction levels	
 **Employees**	Consolidate customer ticketing, queries and feedback, customer enquiry resolution and other relevant data	✓ Increased efficiency in tracking KPIs and other metrics, e.g. Guest Experience (GX) score, visitor arrival by region, visitor profiling by age group ✓ Quicker identification and rectification of potential issues
	Real time tracking and obtain insights on customer flow, ticketing and purchase data	

Data Analytics Dashboard for customer service (2 of 3)

Challenge: **Manual reconciliation and analysis of ticketing data to drive meaningful insight**

Features of Data analytics dashboard*

Customisable data visualisation	Ability to customise charts, graphs and other visualisations
Data dissection filters	Ability to showcase data according to the required filters, such as customer demographics and time intervals
Predictive analysis	Ability to analyse current and past data to identify trends to develop customer service strategies
Integration with data platforms	Ability to integrate with Customer Relationship Management (CRM) system, Customer Data Platform (CDP) and other data gathering sources
Multiple dashboards and views	Multiple dashboards can be created based on different business needs
Drill Throughs	Ability to show more detailed information about a data point (e.g. net profit and profit by product breakdown)
Drill Downs	Ability to analyse subsets of larger data umbrellas (e.g. country and city)

**Based on common features across systems*

Data Analytics Dashboard for customer service (3 of 3)

Challenge: **Manual reconciliation and analysis of ticketing data to drive meaningful insight**

Considerations for adoption

- **Establish desired functionalities –** Dashboards can be formatted and built according to the data the attractions wants to view the most and track their main KPIs, e.g. customer service targets such as overall customer satisfaction levels
- **Data security –** Important to ensure that data shared from other systems are secured, so as to prevent data leaks
- **Team training and support –** Essential to provide employees with training for the dashboard to drive higher adoption rate
- **Adoption of complementary tools** – Data analytics solution needs to be complemented with automated data cleaning and consolidation; consider solutions that can extract and manage data from multiple sources into a single platform to increase ease of implementation, e.g. Software as a Service (SaaS) solutions that automate process).
- **Importance of intuitive interface –** Intuitive design and functionality is important to ensure functions and operations are quickly picked up by staff, as they may need to customise their own dashboards in the future.

Enablers

- Electronic data gathering sources such as Internet of Things (IoT) sensors and self- service ticketing kiosks

Possible integrations

- Ticketing System
- CRM system
- CDP
- IoT sensors

Roles & accountabilities

Business Owner: Customer Service

Product Owner: IT Team

Champion: Customer Service, Sales and Marketing

Myth: "Acquiring huge volumes of data is required for an effective dashboard"

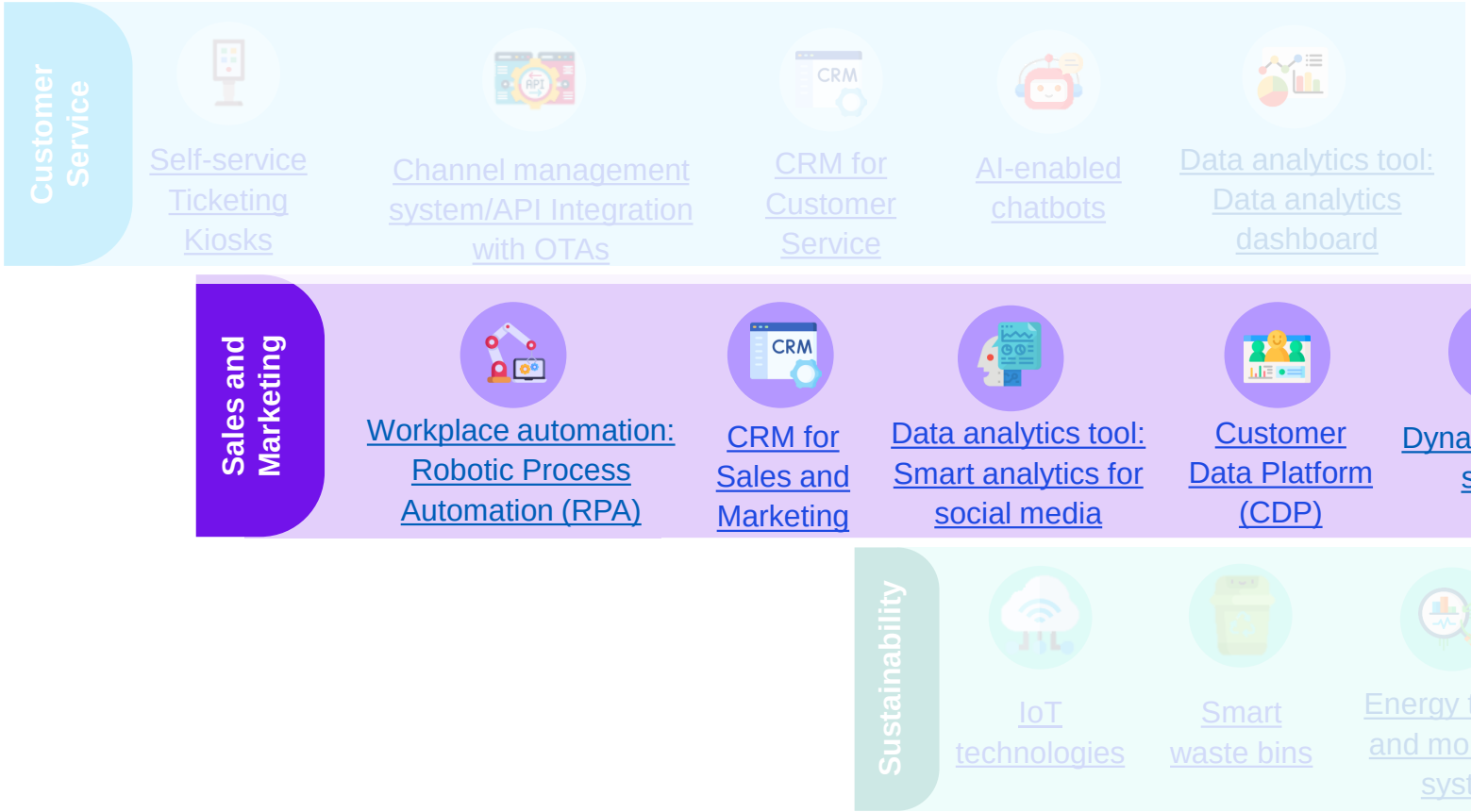
Data analytics dashboards are created to work with large volumes of data. However, it is not necessary for your attraction to be raking in overwhelming quantities of data to make your dashboard an effective tool. Quality of data is more important where good quality data covers 7 essential dimensions such as completeness, consistency and accuracy. The dashboard will then provide your attraction with a clear and comprehensive story about your attraction's performance.*

*Source: STB Data Governance and Quality playbook

Technologies

Sales and Marketing

This section covers the following technologies for the sales and marketing job function



Sales and Marketing

Robotic Process Automation (RPA) for manual tasks (1 of 3)

Opportunity: **Automation of repetitive, multi-step tasks**

What is RPA?

Robotic Process Automation (RPA) is an advanced form of workflow automation. RPA can automate multi-step, repetitive work processes. It uses a rule-based software to perform these tasks at high speed and volume.

Consider RPA if...

- Your attraction has a high volume of repetitive administrative processes
- Your attraction handles high volume of data that sits on different platforms

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	NA	✓ Increased productivity of operations ✓ Opportunities to allocate staff to focus on higher value activities requiring high-touch interactions or human interventions ✓ Improves work processes, productivity and staff engagement as repetitive, mundane tasks are automated
 **Employees**	Automate multi-step, repetitive processes e.g. sending mass emails, data consolidation and data cleaning from various systems Inform the pricing strategy process by automating the website-scraping process to monitor pricing trends in adjacent attractions Manage event and group bookings for corporate customers – across the quotation process and contract management cycle	✓ Reduction in manual, repetitive and time-consuming tasks which allow employees to focus on other higher-value tasks ✓ Minimise human error

Sales and Marketing

Robotic Process Automation (RPA) for manual tasks (2 of 3)

Opportunity: **Automation of repetitive, multi-step tasks**

Features of RPA*

Creation of task	Ability to set rules for the bots to follow
Task recorder	Ability to record the steps of a simple task for automation e.g. When filling up a online form, the user can record the steps of filling the form for the RPA bot to replicate
Debugging	Ability to identify an error in running the bot and apply corrections to rectify the error, i.e. run the bot to test that each step is accurately configured as per the user's intention
Dashboard	Ability to gain oversight over all the bots, manage and scale bots
Activity or bot library	Have a comprehensive library with pre-built-in activity templates to drag and drop, such as sending an email, or fully functioning bots that can be downloaded
Schedule task bot	Ability to create a schedule for when the bots should run

Based on common features across systems

Sales and Marketing

Robotic Process Automation (RPA) for manual tasks (3 of 3)

Opportunity: **Automation of repetitive, multi-step tasks**

Considerations for adoption

- **Critical factors for vendor selection** – Factors to consider are the provision of network security, customer support and training provided.
- **Selecting the right software** – Some software require users to have basic knowledge of programming while others are entirely beginner friendly. In addition, ensuring compatibility with existing systems ensures interoperability and reduce additional cost incurred for integration.
- **Proper change management** – Ensure that staff are aware and clear on how RPA changes the way of work and its benefits, and are onboard to implement RPA initiatives.
- **Get more exposure to RPA** – Consider different ways of attaining internal RPA expertise to scale up implementation e.g. upskilling workers through knowledge transfer from vendor, attend external training sessions or recruiting technical expertise.

Enablers

- Compatibility with existing legacy systems

Possible integrations

- Can be used with 3rd party applications, e.g. CRM system, Microsoft Excel
- Integrate RPA with AI capabilities for more intelligent automation

Roles & accountabilities

Business Owner: Marketing
Product Owner: IT Team
Champion: Marketing

Tip: Define your success criteria from the beginning

This reduces the challenge of proving Return on Investment (ROI) in the long run and helps attraction to evaluate the usefulness of RPA to the business. Success criteria could encapsulate both employee and visitors' experience.

Case study: Robotic Process Automation (RPA) for manual tasks (1 of 2)

Featured attraction: Mandai Wildlife Group

The Challenge

To facilitate the human resource (HR) onboarding process from when an employee accepts their offer to their first day of work, the attraction required multiple parties (such as HRIS, Payroll, Assistant HR Business Partner, HR Business Partner, Hiring Manager, HR Admin, IT and the new joiner) to act at different stages of onboarding.

The entire process was undertaken with manual data entry into various Microsoft Word and Excel documents, as well as HR Information Systems and SuccessFactors. This resulted in two key challenges:

- Accumulation of wait time at each stage, as the next action was dependent on the previous parties' action; and
- Repetition of data uploaded into different documents and platforms.

While there was use of existing tools within Microsoft Word and Excel (e.g. the mail merge function), time savings were not substantial as waiting time and repetition across different documents and platforms was not alleviated.

Although this case study is set in the HR context, the solution can be applied to sales and marketing since it aids in collecting customer-related documents from multiple sources into a central location, easing process management.

The Solution

First, the attraction mapped out and streamlined five sub-processes* with opportunities for automation, by reviewing the following questions with stakeholders:

1. Is this step of the process absolutely necessary? i.e. are some steps from previous processes already obsolete?
2. Is there any way to minimise human intervention in this step?
3. Is the information required in subsequent steps already produced in earlier steps? If so, can the bot read from the previous source rather than having the user replicate the information?

The objective of this task was threefold:

1. Remove inefficient decision nodes
2. Reduce human intervention where possible
3. Increase control over essential parts

After the business process review, the attraction configured RPA codes, tested and deployed them for use.

RPA is used on a daily basis to onboard new hires on a large scale due to the recent rise in recruitment and onboarding activities.

The project was championed by a project team within HR and co-implemented with an appointed external RPA vendor. The implementation took 16 weeks, accounting for the vendor's timeline.

**Five sub-processes: sending onboarding documents, receive onboarding documents, creation of position, request assets and send reporting details, and arrange induction programme*

Case study: Robotic Process Automation (RPA) for manual tasks (2 of 2)

Featured attraction: Mandai Wildlife Group

Considerations

- To promote adoption of RPA within the team:
  - Anticipate and acknowledge concerns around usability and cybersecurity during implementation of RPA by involving stakeholders in the creation process (e.g. end-users for usability and IT for cybersecurity), and accurately framing the project as a proof of concept
  - Keep employees informed on the technology's success stories in other companies to build confidence
  - Conduct workshop with relevant stakeholders to develop know-how and hands-on experience with the technology
- Ensure the project team includes end-users to implement their considerations from the beginning. For example, end-users provided feedback that documents relating to a sub-process are often retrieved via multiple emails – hence the bot was programmed to download documents from the types of sources earlier identified by users.
- Start with a simple and short process before expanding to more complex ones. Mandai selected the onboarding process and broken it down into 5 sub-processes that were relatively straightforward and contained to a single department, and with low variability in document sources.
- Human intervention is still required at different stages to address any abnormalities or special cases, hence segregation into sub-processes is important. The benefit of human intervention is the earlier detection and address of abnormalities or special cases.

Results

- **Time savings of 66%** based on an estimated 20 new joiners per month. This value increased in months with more new joiners.
- **Increased accuracy of data** entry into HR systems.
- Adoption of an emerging technology like RPA has **generated interest and excitement** in the attraction– a longer-term impact analysis in progress to determine how RPA can be expanded to other functions.

Pitfalls to avoid

- Planning of process flows – it is important to consider the different scenarios and code the process sufficiently flexible to account for such different scenarios, so as to minimise changes at a later stage.
- Proper documentation of the RPA codes and process flows – for easier maintenance of RPA codes and teaching new users. The project team was actively involved in the coding of the processes into the bot.

Sales and Marketing

Customer Relationship Management (CRM) System (1 of 3)

Challenge: **Manual consolidation for reporting due to fragmented sales data | Lack of integration between marketing and sales data**
Manual consolidation and analysis of marketing data across platforms | Lack single view of customer due to fragmented data

What is CRM?

A CRM system centralises customer data within one system and provides critical insights needed to drive customer engagement and enhance customer experience. Customer information is centrally stored, tracked and analysed and updated in real-time. The software empowers the attraction to track customer sales and marketing data, enabling personalised marketing efforts for different customer segments, driving more personalised promotions to customers.

Consider a CRM system if...

- Your attraction would like to implement targeted customer marketing strategies
- Your attraction's customer engagement strategy emphasises retention and loyalty

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Synchronise data from multiple data sources into one holistic view e.g. integrations with POS system, email marketing software, survey tool	✓ Provide insight into correlation between marketing strategies and sales performance ✓ Boost sales and revenue by addressing customer needs with targeted marketing ✓ Improve ROI on marketing spend
	In-depth analysis of marketing strategies and sales data	
 **Employees**	Automate the process of crafting and sending personalised emails and SMSes, particularly for targeted marketing campaigns	✓ Increase efficiency in managing multiple marketing platforms and campaigns ✓ Gain holistic overview of marketing efforts across all platforms ✓ Enhance customer experience and journey by refining individual touchpoints ✓ Offer insight into customer purchase patterns, enabling employees to create relevant add-on, upgrade and complementary product baskets and packages
	Provide improved sales lead management, to understand the customer lifecycle and variations in purchase process	
	Tracking of customer interactions with the attraction throughout customer's lifecycle	
	Upselling and cross-selling of products	

Sales and Marketing

Customer Relationship Management (CRM) System (2 of 3)

Executive Summary
Overview
The Journey
Your Roadmap
Technologies
Getting Started

Challenge: **Manual consolidation for reporting due to fragmented sales data | Lack of integration between marketing and sales data**
Manual consolidation and analysis of marketing data across platforms | Lack single view of customer due to fragmented data

Stages of implementation

Features of CRM*

Email marketing	Ability to consolidate customers' emails and send automated emails or personalised marketing emails
Marketing analytics	Ability to view marketing efforts through a centralised hub, e.g. dashboard, from social media campaigns to email marketing
Lead management	Ability to track and convert marketing leads (from campaigns) across all channels into contacts
Contact management	Ability to consolidate data from direct customer interactions to gain a complete view of individual customer
Customer segmentation	Ability to create segmented audiences (customers) and deliver personalised advertisements
Customer journeys	Ability to create customer journeys, where rules can be created to trigger specific actions (e.g. automated follow-up EDM if customer does not make purchase within 3 days of the 1st EDM)
Customer data analytics	Ability to analyse data to optimise future campaigns and gain insights into customer journey
Data visualisation and reporting	Ability to create custom dashboards for data visualisation and reports from customer data
Integration with other systems	Ability to integrate with 3rd party platforms
Artificial Intelligence	Ability to scale analytics through AI to provide further, in-depth analysis e.g. sales forecasting, predicting lead scoring

**Based on common features across systems*

Customer Relationship Management (CRM) System (3 of 3)

Challenge: **Manual consolidation for reporting due to fragmented sales data | Lack of integration between marketing and sales data**
Manual consolidation and analysis of marketing data across platforms | Lack single view of customer due to fragmented data

Considerations for adoption

- **In-depth vendor selection process –** Factors such as automated feedback channels, number of channels and depth of analysis, need to be considered in the vendor selection process.
- **Selecting fit-for-purpose CRM –** Attractions should evaluate which functionalities are important to them based on factors such as their marketing strategy, budget and ease of integration with existing systems to meet attractions' needs.
- **Quality of data –** Implementing a CRM system alone is insufficient in deriving good customer insights. Good quality of data is important and attractions need to ensure that the data is properly cleaned to remove any anomalies and irrelevant data. Robotic Process Automation (RPA) may be used for this.

Enablers

- Current customer data collection platforms in use by attraction
- Current ticketing, sales and marketing systems in place

Possible integrations

- Data analytics dashboard
- Self-service kiosk
- Customer Data Platform (CDP)
- Point-of-sale (POS) system
- Robotic Process Automation (RPA)

Roles & accountabilities

Business Owner: Sales and Marketing

Product Owner: IT Team

Champion: Customer Service, Sales and Marketing

Myth: "CRM is a costly investment"

As the software as a service (SaaS) market has scaled over time, many providers offer competitive price points catering to different feature tiers. Attractions can choose the built-in features that are most relevant, so as to further save on software customisation costs. Many CRM software providers have tiers in their subscription plans, allowing the attraction to pick one that suits your needs.

Case study: CRM, Facial Recognition and Visitor Profiling (1 of 2)

Executive Summary
Overview
The Journey
Your Roadmap
Technologies
Getting Started

Featured attraction: iFly Singapore

The Challenge

In the past, the attraction would only use its ticketed customers data to derive visitorship numbers. This resulted in inaccurate numbers since it was not accounting for walk-ins or bistro visitors. The team would guesstimate the number of visitors to craft business strategy, which led to a misalignment between management (in setting sales KPIs) and staff (in meeting sales KPIs).

For ticketing, the attraction did not have any tracking system in place. They provided wristbands to visitors after purchasing a ticket and would have to allocate manpower to usher guests through the gantry, but this was a manual process. The team wanted to track how much each visitor spent but due to lack of data and technology to track it, they resorted to using average spend values to craft their business strategies, such as creating product bundles.

The Solution

The attraction used CCTV and employed a software from an external vendor, Trakomatic as a solution for people counting and profiling. They were able to capture data such as the visitors' gender and age (with 80% accuracy), dwell time and location.

This information is stored in their local server. By looking into visitorship data, the attractions can determine the lull period and design promotions to increase visitorship.

Additionally, the attraction used a CRM system which pulls data from the ticketing system and tracks ticket purchase data such as customers' name, nationality and amount spent. With visibility to the amount spent per pax, the attraction gained more insight into the behaviour of different customer segments. This helped the team make key decisions on pricing packages for different customer segments, such as introducing new ways to upsell products for locals. Therefore, the attraction can offer the relevant bundles accordingly.

The CRM system is set to automate the customised EDMs for the customer journey. For first timers, after the guests have gone through the experience, they will receive an email where they can purchase a package at a discounted rate as a return guest. For members, upon signing up, the CRM will trigger a welcome email and share the entitlements with the members. Also, once the member's package is about to be completely used up, an email will be triggered to inform them as well as prompt them to top up.

The implementation took approximately nine months to go live and was championed by the customer service manager and marketing team. The people profiling solution is currently run by the operations manager and the CRM is run by the marketing team.

Case study: CRM, Facial Recognition and Visitor Profiling (2 of 2)

Featured attraction: iFly Singapore

Considerations

- Work with a subject matter expert (SME) who has extensive knowledge on the technology and can assist the team with implementation and adoption in an efficient and cost-effective manner.
- Conduct a needs analysis to understand what type of technology and customisations are required and then determine which system and vendor is most suitable.

Results

- Payback period of approximately **3-4 years**.
- **Greater access to customer data** to develop business and promotional strategies.
- **Increase in employee productivity** since visitors can check-in through facial recognition system without any staff assistance.
- **Manpower cost savings of one headcount per day** due to the installation of their facial recognition system. Fewer staff are required at the entrance to admit guests.

Pitfalls to avoid

- Identify the end-goal for technology stack – although the facial recognition system and the Enterprise Resource Planning (ERP) systems were compatible, implementation took longer than expected as the ERP system was changed midway. However, solutions iFly Singapore may want to adopt in the future must be compatible with existing systems. If the API integration is not straightforward, it will cost them time and money.
- Select vendor that provides the level of service expected – iFly Singapore acknowledges that their current vendor is helpful, and will send staff down to the attraction to help resolve the issue.
- Discern system integration issues before embarking on the project and have a clear direction on the visualisation.

Smart analytics for social media (1 of 3)

Challenge: **Manual consolidation and analysis of marketing data across platforms**

What is smart analytics?

A smart analytics software uses natural language processing and machine learning to pore through data from social media sites related to post-visit reviews/complaints received, and online conversations about the attraction. The attraction can use this tool to pre-emptively deal with negative comments and protect their brand reputation, or crowd source trending ideas for marketing campaigns.

Consider smart analytics if…

- Your attraction has a high level of customer engagement on social media
- Your attraction would like to achieve further insight into customer opinions and feedback

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Recognise customer sentiment trends and customer opinions related to attraction and its services	✓ Improve customer service practices using customer feedback ✓ Identify better-performing areas of customer service based on customer sentiment ✓ Increase visibility on marketing performance for easier decision making in budget allocation across social media platforms ✓ Swift response to negative sentiments towards attraction on third-party partners' platforms
	Optimise marketing spend in accordance to campaign and platform performance	
	Identify mentions or issues related to the attraction raised on third-party partners' (e.g. Online Travel Agents) social media pages	
 **Employees**	Track social media mentions and measure engagement rates to monitor brand reputation and understand customer sentiments	✓ Identify key demographics of target audience and analyse their areas of interest in the attraction ✓ Improve marketing content based on demographics analysis ✓ Increase visibility and reach of social media content to target audience ✓ Track effectiveness of customer engagement and outreach efforts on brand reputation
	Provide real-time insights into social media conversations, to quickly ascertain and address customers' concerns	
	Predict and recommend ideal posting time to upload content onto social media platforms	

Smart analytics for social media (2 of 3)

Optional

Challenge: **Manual consolidation and analysis of marketing data across platforms**

Features of smart analytics for social media*

Data segmentation	Ability to segment customers into desired demographics, to identify key customer groups and influencers
Dashboard and visualisation	Ability to present their social media performance metrics (e.g. engagement rate) in a summarised and intuitive manner
Sentiments analysis	Ability to identify tone and intent of social media content, so as to determine if the attraction has mostly positive or negative feedback
Trends analysis	Ability to analyse trends and insights from unstructured data, such as social media posts and comments from different, unrelated users
Share of voice analysis	Ability to analyse brand awareness and presence as compared to rest of industry
Social listening	Track every mention of attraction on social media in real-time
Clustering analysis	Ability to make associations between commonly recurring phrases to identify new issues and opportunities
Behavioural analysis	Ability to understand social media users' concerns according to their behaviour types

**Based on common features across systems*

Sales and Marketing

Smart analytics for social media (3 of 3)

Challenge: **Manual consolidation and analysis of marketing data across platforms**

Considerations for adoption

- **Review existing technologies implemented –** CRM systems may have similar features to smart analytics. The options available to attractions include implementing a standalone smart analytics system or adding on an inbuilt feature available in some CRM systems.
- **Significance of social media –** Evaluate the attraction's level of emphasis on social media in its marketing strategy. This ensures that the eventual insights harnessed by smart analytics will be useful for attractions in assessing its marketing performance.
- **Limitation in gathering insights from private social media accounts –** However, smart analytics can still gather information from multiple online sources such as blogs and news articles.
- **Evaluate the usefulness of smart analytics in other areas of the business** – Consider other marketing platforms or business initiatives that can benefit from the trends and insights provided by smart analytics. This helps to maximise the usefulness of the tool, and can help drive more targeted messaging to potential visitors.

Enablers

- Access to attraction's social media accounts

Possible integrations

- CRM system
- Data analytics dashboard
- Customer Data Platform (CDP)

Roles & accountabilities

Business Owner: Marketing
Product Owner: IT Team
Champion: Marketing

Tip: Focus on metrics which align to the social media strategy

The smart analytics tool can be configured to focus on metrics that matter to the attraction, depending on its objectives to drive:

- *Awareness – Reach of your content*
- *Engagement – How audiences are interacting with your content*
- *Conversion – Effectiveness of your social engagement*
- *Sentiment – How customers perceive the brand*

**Based on common features across systems*

Sales and Marketing

Customer Data Platform (CDP) (1 of 3)

Challenge: **Lack of a single view of the customer due to fragmented data**

What is CDP?

A Customer Data Platform (CDP) combines data from customer interactions across multiple touch points to create a single centralised customer database. Customer profiles can then be created from segmenting data in a multiple ways to create more personalised marketing campaigns via activation tools like consumer marketing platforms (Google Ads, Facebook), Email and SMS marketing tools, customer service chat solutions and more.

Consider CDP if...

- A large percentage of your attraction's visitors are returning guests
- You have more than one attraction in your purview
- Guests have multiple touchpoints with your attraction

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Utilise detailed reports to make data-driven decisions in relation to sales and marketing strategies	✓ Increased confidence in making strategic decisions to drive revenue ✓ Identify key marketing channels that customers are using
 **Employees**	Access customer details via cloud-based system	✓ Gain in depth understanding of customer profile in real-time ✓ Gain a holistic view of the customer using data from different systems (integration) for future marketing initiatives ✓ Efficiently deliver targeted and relevant marketing to real-time profiles
	Connect and access customer data from multiple systems in a single platform	
	Real-time personalisation at a scale – market to more individual customer groups at an accelerated pace	

Sales and Marketing

Customer Data Platform (CDP) (2 of 3)

Challenge: **Lack of a single view of the customer due to fragmented data**

Features of CDP*

Unified customer profile	Ability to integrate, clean and stitch data from multiple sources to provide a unified overview of each customer
Real-time segmentation	Ability to provide customer behaviour insights through filters such as engagement level, churn rate and sales conversion rate
Real-time personalisation	Ability to gather real-time customer information to develop relevant, personalised marketing initiatives
Customer analytics	Ability to produce reports including customer, campaign and demographic segmentation analysis, and to provide insight into marketing campaign successes and recent sales rates
Centralised analytics dashboard	Ability to showcase relevant and desired information on a single page for quick understanding
Customer data activation	Ability to analyse raw customer data to produce insights and provide actionable steps that can be applied to appropriate sales and marketing initiatives, e.g. identifying customer purchase preferences and providing discounts or cross-selling by pairing with F&B or attraction merchandise
Optional **Customer profile enrichment**	Ability to enhance customer database by integrating data received from second and third party vendors such as statistics companies

Based on common features across systems

Sales and Marketing

Customer Data Platform (CDP) (3 of 3)

Challenge: **Lack of a single view of the customer due to fragmented data**

Considerations for adoption

- **Training and certification –** Necessary to train staff (power users) in data management for staff, to understand the reporting ecosystem and functionality required to perform their role.
- **Vet data sources –** Identify all data sources to be integrated with CDP, and ensure current data sources such as marketing automation platforms and analytics tools are capable of being integrated.
- **Identify technology dependencies –** Attractions should consider adopting a Customer Relationship Management (CRM) system prior to CDP to leverage on first-party data provided.
- **Be aware of data privacy regulations –** Comply to privacy regulations, e.g. Singapore Personal Data Protection Act (PDPA) when collecting and using customer data.

Enablers

- Data sources such as CRM, data analytics systems, emails and feedback surveys

Possible integrations

- Social media and other marketing outlets
- Third party databases

Roles & accountabilities

Business Owner: Marketing
Product Owner: IT Team
Champion: Marketing

Myth: "CDP and CRM perform the same role"

While CDP and CRM are both customer data centric platforms, they perform complementary but different roles. CRM collects and manages individual customer interactions which provides a granular view of the customer. Whereas, CDP collects data on customer behaviour from every touchpoint, e.g. website and digital products including CRM, providing an overview of different customer segments.

Sales and Marketing

Dynamic pricing system (1 of 3)

Challenge: **Lack of information to determine dynamic optimal price**

What is dynamic pricing system?

A dynamic pricing system is able to dynamically change the pricing of tickets based on factors such as customer behaviour, seasons and time-of-day. The system can be used to implement a range of pricing strategies, and integrate with other platforms such as ticketing and CRM software.

Consider dynamic pricing if...

- Your attraction has fluctuating customer volumes
- Your attraction would like to increase customers for off-peak periods
- Your attraction would like to improve revenue without increasing capacity

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Implementation of various price points based on demand, seasons and time-of-day	✓ Maximise sales revenue through targeted pricing
	Use of machine learning and statistical modelling to implement different prices for different customer groups, based on location, demographic information and more	
 **Employees**	Suggestion of pricing based on applied restrictions e.g. maximum and minimum prices, maximum tickets available	✓ Reduce employee effort in manually crafting pricing ✓ Employees can better plan manpower required based sales projections of when are peak and non-peak periods
	Upselling and cross-selling of products	

Sales and Marketing

Dynamic pricing system (2 of 3)

Challenge: **Lack of information to determine dynamic optimal price**

Features of dynamic pricing system*

Pricing suggestions based on live market data	Ability to analyse customer trends and patterns across the attractions industry, including sales trends in other attractions, and accordingly providing pricing suggestions
Easy repricing and adjustments	Ability to quickly change and apply new ticket prices across sales platforms
Predictive insights	Ability to project attraction's sales patterns and customer trends
Automated pricing (Optimise using AI)	Ability to constantly change and improve pricing based on algorithms, long term pricing data and historical data
Set pricing campaigns	Ability to change ticket prices for specified periods of times e.g. flash sales
Price tracking dashboards	Ability to create custom dashboards (data visualisation) and reports from customer sales data
Integration with other systems	Ability to integrate with ticketing platforms and other data sources
Profitability analysis	Ability to analyse sales revenue based on varied pricing

**Based on common features across systems*

Sales and Marketing

Dynamic pricing system (3 of 3)

Challenge: **Lack of information to determine dynamic optimal price**

Considerations for adoption

- **Complexity in integration with third party sellers –** Attractions may want to ensure that the dynamic pricing strategies implemented are upheld in all third party sellers, such as OTAs and traditional TAs. Attractions can consider implementing an integrated portal for all resellers to view the same rate and availability at any time.
- **Understanding customers' cost preferences –** It is important to understand the customers' ability and willingness to pay for tickets. It is therefore important to analyse the market, so as to ensure that range of prices are considered reasonable vis-as-vis the other attractions.
- **Adoption readiness –** Attraction should evaluate its readiness to adopt dynamic pricing by factoring in the ability to identify market trends, volume of historical available for analysis and ability to continuously collect customer sentiments in response to its pricing strategies. By gathering these information, it could better ease the adoption of dynamic pricing.
- **Visitor frequency –** Customer visit frequency is a consideration for implementing a successful dynamic pricing strategy. Visitors that frequent an attraction will be more acutely aware of the changes in pricing, while one-time visitors or infrequent visitors will be largely unaffected. Attractions should be prepared to respond to the concerns of recurring visitors.

Enablers

- High volume and high quality of historical and real time data, so that it can capture customer price preferences more accurately

Possible integrations

- CDP
- Data Analytics Software
- Ticketing Systems
- API Integration with OTAs/Channel management system

Roles & accountabilities

Business Owner: Sales and Marketing
Product Owner: IT Team
Champion: Sales and Marketing

Tip: Identify customer groups to focus on

It is important to identify specific customer segments that the attraction can further target through higher pricing, more cross-selling features, loyalty programmes and discounts, so as to maximise both sales revenue and customer satisfaction.

Technologies

Sustainability

This section covers the following technologies for the sustainability job function

Customer Service

- Self-service Ticketing Kiosks
- Channel management system/API Integration with OTAs
- CRM for Customer Service
- AI-enabled chatbots
- Data analytics tool: Data analytics dashboard

*Customer Relationship Management system (CRM)

Sales and Marketing

- Workplace automation: Robotic Process Automation (RPA)
- CRM for Sales and Marketing
- Data analytics tool: Smart analytics for social media
- Customer Data Platform (CDP)
- Dynamic pricing system

Sustainability

- IoT technologies
- Smart waste bins
- Energy tracking and monitoring system
- Emissions management system
- Renewable energy

Sustainability

Internet of Things (IoT) technologies (1 of 3)

Challenge: **Manual control of appliances to reduce energy consumption**

What is Internet of Things (IoT)?

IoT in sustainability refers to the use of sensors, monitors and other control devices connected via a cloud system to a central database which allows the attraction to track the usage of electricity, water and other utilities, and to identify any flaws or failures without requiring constant inspections.

Consider IoT if...

- Your attraction handles high usage of utilities that require constant monitoring

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Real-time detection of energy inefficiencies and live reading of energy consumption levels	✓ Optimise energy usage leading to significant cost savings
	Integration with other systems e.g. smart facility management	
 **Employees**	Automation of manual data collection to improve data accuracy	✓ Increase accuracy of data collected Increase in productivity of employees who can now focus on more strategic tasks ✓ Reduce costs by doing repairs when needed rather than regular repair checks
	Predictive maintenance – Real-time monitoring of appliance performance to provide protection against damages and surges	

Internet of Things (IoT) technologies (2 of 3)

Challenge: **Manual control of appliances to reduce energy consumption**

Features of IoT technologies*

	Utilities detection sensors	Ability to monitor utilities consumption level in real time and provide tools for analysis and detection of maintenance issues, and control utilities based on consumption patterns and external factors e.g. lights controlled through motion sensor to detect human motion, CCTVs to assess real time crowd density
	Signal-to-action actuators	Ability to read real time data and act on a designated command (e.g. remotely turn off unused appliances)
	Central dashboard with quick view data display	Ability to summarise and visualise data in a simplified manner
Optional	**Interactive dashboard**	Ability to re-design the central dashboard to fit your needs
Optional	**Predictive analysis**	Ability to identify next best action for repairs and maintenance based off data collated from sensors
Optional	**Environmental monitoring**	Ability to identify presence of pollutants in air and water, and track temperature and humidity levels

*Based on common features across systems

Internet of Things (IoT) technologies (3 of 3)

Challenge: **Manual control of appliances to reduce energy consumption**

Considerations for adoption

- **Virtual Security** – Conduct security and risk assessment to identify potential threats and vulnerabilities. Pertinent to implement firewalls and antiviruses to prevent digital attacks on the IoT system.
- **Upskilling and support employees –** Essential to invest in upskilling opportunities such as training for employees to increase technological knowledge and skills.
- **Integrability with legacy systems** – Attractions must conduct a thorough compatibility check, to ensure that current systems such as facility and building management systems are able to accommodate new IoT features.

Enablers

- Digitally connected appliances e.g. sensors, CCTVs
- Extensive and reliable network connection to transmit data through Wi-Fi or cellular data such as 5G

Possible integrations

- Smart facility management
- Data analytics dashboard
- Smart waste bins

Roles & accountabilities

Business Owner: Sustainability
Product Owner: IT Team
Champion: Sustainability

Myth: "Internet of Things are just about sensors"

While detection and collection of data is heavily reliant on sensors, an IoT network consists of other key features which enables the processing of raw data and remote control of applications that are part of the network.

An example of such a feature is a central dashboard, which enables the user to access consolidated data, collected by the sensors, that provides quick understanding of the attraction's current state of appliances. Predictive analysis, another such feature, uses the consolidated data to recommend next steps and best actions to take.

Sustainability

Smart waste bins (1 of 3)

Challenge: **Manual waste level monitoring**

What are smart waste bins?

Smart waste bins have in-built trash compacters which increase its capacity beyond regular trash bins, smart sensors for capacity measurement and automatic notification systems that inform cleaners when the bin is full.

Smart waste bins use gateway technology to collect and send data from smart bin sensors to the cloud. The data enables the system to create optimised waste clearing routes based on bins that are full.

Consider smart waste bins if...

- Your attraction would like to reduce the number of waste bins over a large attraction area, and have high waste volume
- Your attraction would like automated analysis of waste management

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Track waste occupancy ratio of bins	✓ Identify areas of improvement based on data analysed from bins ✓ Increase productivity of waste management teams using alerts and route optimisation ✓ Improve visitor experience, health and safety by preventing overflowing bins and pests
	Optimised waste management route plan	
 **Employees**	Notifications to alert cleaners when a bin is full	✓ Reduce frequency of checking and clearance of bins ✓ Reduce number of bins required in every area of attraction
	Internal compacters and increased capacity	

Smart waste bins (2 of 3)

Challenge: **Manual waste level monitoring**

Features of smart waste bins*

Optional	**Capacity detectors**	Ability to detect capacity of waste inside bins
	Internal trash compacters	Ability to compress and compact trash to create additional space
	Notifications	Ability to notify waste management team when bin is full through SMS or other notification modes
	Route optimisation	Ability to generate schedules to optimise waste management route i.e. include only bins that need to be emptied on the route, using GPS
	Solar powered	Ability to install solar panels on bin for its energy needs

Based on common features across systems

Smart waste bins (3 of 3)

Challenge: **Manual waste level monitoring**

Considerations for adoption

- **Solar powered bins –** When implementing bins that are solar powered, it is necessary to ensure that they are placed out in the open to maximise solar functionality.
- **Identify high volume areas –** While smart waste bins have higher capacities, it may be beneficial for attraction to note areas with higher visitor volume, so that they may place more smart waste bins in those areas.

Enablers

- Data on customer footfall and flow to determine bins placement

Possible integrations

- IoT sensors
- Data analytics dashboard

Roles & accountabilities

Business Owner: Sustainability
Product Owner: IT Team
Champion: Sustainability

Tip: Regular maintenance is essential

While smart waste bins are largely self sustaining and low-maintenance, it is still essential to perform regular checks, or install maintenance sensors to ensure that the bins are in good condition.

Sustainability

Energy tracking and monitoring system (1 of 3)

Challenge: **Manual energy consumption tracking | Manual consolidation of data**

What is an energy tracking and monitoring system?

An energy tracking and monitoring system tracks energy usage by type of energy and energy consumption over time. It helps to identify points of wastage, so that attractions can implement energy reduction measures. The quantification of energy usage documented through the system would further allow attractions to assess the effectiveness of their energy efficiency measures and the potential energy savings.

Consider an energy tracking and monitoring system if...

- Your attraction aims to reduce operational expenses and optimise energy spending

Stakeholders	Use cases	Benefits
Management and C-suite level	Generate daily or weekly comprehensive energy use reports Identify areas of high energy usage and energy reduction opportunities Set energy goals based on data-driven insights	✓ Optimise energy usage leading to significant cost savings ✓ Increase in the ease of monitoring energy usage across the attraction over time ✓ Establish realistic energy goals with greater accuracy and ease ✓ Reduce attraction's carbon footprint
Employees	Detect spikes in energy usage, indicating possible leaks or damages, and providing alerts for areas that require repairs	✓ Instantly notify exact problem areas of high energy wastage ✓ Centralised view of key figures reduces time taken to compile data points ✓ Quicker rectifications of issues requiring repairs works

Energy tracking and monitoring system (2 of 3)

Challenge: **Manual energy consumption tracking | Manual consolidation of data**

Features of energy tracking and monitoring system*

Objectives and timeline setting	Ability to set energy goals with the use of historical and real-time data, and chart the duration required to reach set energy goals using data driven insights
Integration with existing systems	Ability to connect to existing energy systems such as meters and data loggers, and to extract data from sources such as spreadsheets
Measure energy consumption	Ability to measure energy consumption and report on progress towards its energy consumption KPIs
Reporting	Ability to generate reports on energy use and trends across all areas in the attraction
Identify energy-saving opportunities	Ability to identify areas of inefficiency where energy consumption can be reduced based on consumption tracking
Verify energy savings	Ability to confirm if goals have been achieved at the end of energy projects through verification methods e.g. International Performance Measurement and Verification Protocol

Based on common features across systems

Energy tracking and monitoring system (3 of 3)

Challenge: **Manual energy consumption tracking | Manual consolidation of data**

Considerations for adoption

- **Mandatory submetering systems –** Allows the energy tracking and management system to understand the consumption of installations and buildings. Also allow for real time analysis to detect any anomalies or failures.
- **Presence of Building Management System (BMS) –** A BMS will need to be integrated with the new energy tracking and monitoring system with an intermediate translator such as BACnet. If not integrable, attractions may need to consider a change in BMS vendor.
- **Payback attained through energy sayings over time –** Upon implementation, attractions use the EnMS to detect energy usage and slowly decrease energy costs through simple energy saving measures to benefit from additional energy saving through efficient use of energy and gain payback through energy savings. Each attraction will have to incur different amounts of cost based on their needs and some attractions may require additional costs from areas such as hiring external experts etc. Attractions can consider doing a cost-benefit analysis if required.
- **Data analysis and validation –** Employ data analytics tools to gain insights, identify trends to optimise energy usage. Implement data validation checks on data range, format and consistency to ensure accurate results.

Enablers

- Existing energy tracking systems such as meters

Possible integrations

- **Building Management System** – A BMS works on the macro level, which is the real-time control of the facilities based on configurations or manual control. This complements the micro level operations of the EnMS, which are more analytical and predictive

Roles & accountabilities

Business Owner: Sustainability
Product Owner: IT Team
Champion: Sustainability

Tip: Get ISO 50001 Certified

While not mandatory in Singapore, an ISO 50001 Certification can help your attraction to cement its reputation as a credible and energy efficient operation.

With a verified ISO 50001 certification, your attraction also does not need to submit to further compliance checks by the NEA.

**Based on common features across systems*

Case study: Energy tracking and monitoring system (1 of 2)

Featured attraction: Singapore Discovery Centre

The Challenge

Initially, the attraction relied on manual and basic digital tools to manage their sustainability efforts, namely its energy usage, energy generation and building performance data. The pain points were threefold:

- Inefficient energy usage resulting in wastage and unnecessary expenses
- Manual tracking and management of energy usage which was time-consuming, error-prone and did not provide a holistic picture
- Inability to track progress against sustainability goals e.g. resource reduction and footprint

The Solution

The attraction is implementing Resync's Intelligent Energy Management System (EMS) that uses AI models to optimise energy efficiency by using information on energy consumption, real-time data from Building Management System (BMS), occupancy, and Indoor Air Quality sensors. Their machine learning based algorithm performs advance analytics and provides predictive maintenance, forecasting and optimisation without any human intervention.

The configurable monitoring features and communication capabilities enables the aggregation of all buildings' main operational data, both historical and real-time, via one access point by communicating and acquiring information from various distributed energy assets and IoT sensors. The system also ensures communication with high-level control systems, such as BMS, to optimise the building in real-time.

The implementation process includes the installation of electricity sub meters to monitor energy demand and usage.

This will aid the attraction in understanding its energy consumption patterns and achieving net zero energy goals through behavioural change and optimising daily operations.

The attraction has future plans to integrate occupancy and AI analytics with a demand control system, to allow automatic adjustments to the ventilation and AC based on occupancy and indoor air quality. The objective is to use AI in the future to save energy.

The implementation is expected to take approximately 6-8 months and is championed by the chairman of the board, the attraction's executive director along with support from the Centre Management Department. This program is led by a change manager and action team comprising the sustainability committee, facilities management and IT.

Case study: Energy tracking and monitoring system (2 of 2)

Featured attraction: Singapore Discovery Centre

Considerations

- Have a clear vision and support by the board and management to facilitate the project and showcase a good payback period to underpin project success.
- Behavioural change is complex to implement, but SDC has overcome this by training their sustainability committee* in behaviour change through the participation in the Sustainability In Singapore programme with BCA-SGBC. The programme empowers organisations to implement behaviour changes in consultation with a behaviour change specialist.
- Planning: Develop a comprehensive plan that outlines the goals, objectives, and requirements of your smart building and energy tracking system. This plan should include timelines, budgets, and key performance indicators (KPIs) to measure success.
- Integration: Ensure that your smart building and energy tracking systems are fully integrated with your existing infrastructure, such as HVAC, lighting & water. Failure to integrate can lead to inefficiencies and limit the potential benefits of the smart building.
- Data Analysis: Collecting data is essential, but it is crucial to analyse and utilise the data effectively. Use data analytics tools to gain insights, identify trends, and optimise energy usage.
- Data validation: When porting over data ensure data accuracy by implementing data validation checks, such as range checks, format checks, and consistency checks.

Considerations (continued)

- Vendor lock-in: Be cautious about entering into long-term contracts or exclusive agreements with vendors that limit your ability to switch providers or adopt new technology. Look for open-source and interoperable solutions to maximise flexibility.
- Training: Provide comprehensive training for staff on the use and benefits of the smart building and energy tracking systems. Well-trained staff are more likely to embrace the technology and contribute to its success.

Results

- At least **10% expected energy savings in** (with the installation of energy meters to monitor usage and demand) allowing SDC to achieve its target of becoming a net-zero energy building.
- The payback period is approximately less than **7 years** when combined with other Air Conditioning and Mechanical Ventilation equipment upgrades**.**
- **Real-time data and alerts** to address energy inefficiencies, thereby reducing wastage and cost.
- **Detailed and granular energy usage and insights** will help make informed decisions on energy management and sustainability strategies.
- **Automated tracking and management processes** will free up employees' time thereby improving their efficiency.

At SDC the Sustainability Committee is focused on energy and waste related behaviour changes. These behaviour changes focus on the objectives of becoming a zero energy building by FY23 and reducing waste generation by 10% by FY25.

Sustainability

Emissions management system (1 of 3)

Challenge: **Manual tabulation of carbon emissions**

What is an emissions management system?

Emissions management system aids in accurately tracking emissions such as greenhouse gases at a granular level. They also assist in setting, tracking and achieving decarbonisation and emissions reduction goals.

Consider an emissions management system if...

- Your attraction has multiple sources of emissions that need to be verified regularly and accurately

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Single system to record and report emissions data to stakeholders	✓ Reduce risk in exceeding emissions goals through accurate emissions data collection ✓ Identify high-impact future decarbonisation initiatives through scenario-planning ✓ Simplify audit trails ✓ Increase transparency in ESG reporting ✓ Attract sustainability conscious tourists and investors through transparent emissions reporting
	Tracking performance of emissions management against KPIs	
	Projection of future impact on emissions from future potential strategies	
 **Employees**	Accurate and optimised data collection	✓ Increase accuracy of calculation of emissions data ✓ Improve productivity through automated identification of the biggest emission sources
	Visualisation of accurate data tracking and reporting	

Sustainability

Emissions management system (2 of 3)

Challenge: **Manual tabulation of carbon emissions**

Features of emissions management system*

Optional

Generate reports	Ability to publish reports detailing emission type, source, amount and environmental effects
KPI performance management	Ability to establish goals and emissions-reduction targets based on environmental KPIs
Emissions tracking, accounting and reporting	Ability to accurately track performance, measure, calculate and report emissions data (e.g. Scope 1, 2 and 3 emissions**)
Government policy compliance reports generation	Ability to accurately track and verify emissions data to ensure compliance for sustainability reporting
Scenario modelling	Ability to project the future impact on emissions that future strategies may bring
Financial planning for green transition	Ability to evaluate current expenditure on processes that contribute to emissions, and consider cost requirements of implementing and upkeeping greener practices to replace current processes

**Based on common features across systems*
***Types of emissions:*
Scope 1: Emissions generated from company owned and controlled resources
Scope 2: Emissions generated from utilities provider that company purchases its energy from
Scope 3: Emissions generated from sources outside of Scope 2 e.g. from the production of purchased goods and services and usage of sold products

Emissions management system (3 of 3)

Challenge: **Manual tabulation of carbon emissions**

Roles & accountabilities

Business Owner: Sustainability
Product Owner: IT Team
Champion: Sustainability

Considerations for adoption

- **Virtual Security** – Pertinent to implement firewalls and antiviruses to prevent digital attacks on the IoT system.
- **Team training and support –** Essential to provide a dedicated team of employees with training for KPI performance management and scenario modelling.

Enablers

- Digitally connected appliances e.g. sensors
- Cleaned data sets for consolidation

Possible integrations

- Smart Building Management
- Internet of Things (IoT) sensors

Myths

1. ***"Emissions management system is only used for investor reporting"***
   While a emissions management system does make it easier for attractions to report their current emissions levels, reductions and trends to management and investors, the system is relevant beyond just reporting.

   There is an eventual push for Singapore to be a sustainable urban destination, as seen in Singapore's attainment of the sustainable destination certification based on the Global Sustainable Tourism Council (GSTC)'s Destination Criteria, and the holistic approach towards sustainable tourism in the Singapore Green Plan 2030. Hence is important for attractions to find cost-effective solutions that can help attractions meet necessary standards in the future, and to achieve sustainability certifications.
2. ***"Tracking direct emissions produced by my organisation is enough"***
   Scope 3 emissions are indirect emissions that occur from its operations from up and down the value chain e.g. purchased goods and services, capital goods, transportation and distribution etc.

   Based on the World Economic Forum, Scope 3 emissions can take up ~70% of total carbon footprint and therefore being able to accurately track all types of emissions is essential to efficient emissions management.

Renewable energy – Solar panels (1 of 4)

Opportunity: **Increase reliance on renewable energy**

What is renewable energy?

Energy generated from natural resources (e.g. solar energy, wind energy). Adopting a renewable energy source helps in significantly reducing a company's carbon footprint and demonstrates a commitment towards corporate social responsibility.

For the purposes of this technology focus, this section will focus primarily on solar energy.

Consider solar panels if...

- Your attraction has the physical space to install panels and access them for maintenance
- Your attraction has the autonomy and necessary permissions to install solar panels

Stakeholders	Use cases	Benefits
 **Management and C-suite level**	Access to clean, renewable source of energy	✓ Demonstrate corporate social responsibility, boost brand image and attract environmentally-conscious guests and partners ✓ Achieve energy independence and security by reducing dependence on power grids ✓ Energy cost savings in the long-term ✓ Potential source of income, if excess electricity is produced, it can be sold back to energy providers

Renewable energy – Solar panels (2 of 4)

Opportunity: **Increase reliance on renewable energy**

Attractions can employ two financing models to install solar panels. These include: “Purchase Power Agreement” (PPA) and “Engineering, Procurement and Construction”(EPC). The integration process that attractions can adopt for a PPA financing model is detailed as follows:

Procurement process for PPA model

Solar Provider

- Owns, operates and maintains the solar panels
- Pays for the entire solar panel system

Sign PPA contract

Provides solar energy

Attraction

- Purchases solar energy generated by leasing company over the contract duration
- Provides physical space for solar panels to be installed

A solar PPA is a form of financing agreement that allows an attraction to use solar panels without having to bear the high capex costs. The attraction may lease out a physical space to operate the solar photovoltaic (PV) system.

There are several benefits to this including:

✓ Attractions do not need to bear the capital cost of implementation
✓ Zero operational costs since the provider is responsible for solar panels upkeep and maintenance
✓ Attractions can enjoy a PPA term of 10-25 years, during which the attraction only pays for the energy it uses
✓ Cost savings by replacing electric grid power with solar power

Renewable energy – Solar panels (3 of 4)

Opportunity: **Increase reliance on renewable energy**

Attractions can employ two financing models to install solar panels. These include: “Purchase Power Agreement” (PPA) and “Engineering, Procurement and Construction”(EPC). The integration process that attractions can adopt for a EPC financing model is detailed as follows:

Procurement process for EPC model

Project Planning

- Identify the utility interconnection requirements
- Develop an operational schedule
- Ensure the solar PV system can be activated without disrupting grid power

Secure permits

Ensure compliance with regulatory authorities and secure appropriate licenses (if required)

Urban Redevelop-ment Authority (URA)

Building and Constructi-on Authority (BCA)

Construction

Identify an EPC company. The EPC company will be responsible for:

- ✓ Sourcing quality equipment
- ✓ Mounting the solar panels and accessories
- ✓ Installing grid connectivity aligned with existing power supply system

Authorities’ sign off

After installation is complete, the relevant government authorities must inspect the system, quality of work and construction

Ongoing performance monitoring

EPC company will provide after-sales service and ensure regular performance monitoring and cleaning of solar panels

Sustainability

Renewable energy – Solar panels (4 of 4)

Considerations for adoption

- **Considerations for implementing solar panels –** To ensure that the implementation of solar panels is commercially viable and to ensure maximum return of investment, the attraction should consider the following factors:
  - Availability of land space and infrastructure
  - Lease period (if subscribing to PPA model)
  - Possible revenue from sale of excess energy produced
  - Ensure sufficient back-up capacity in case of change in weather condition, to ensure grid stability and reliability
- **Ensure compliance with URA guidelines –** To follow URA's published set of planning guidelines pertaining to permissions required and installation procedures.
- **Understand EMA's regulations and market registration schemes that apply to the solar PV** – EMA outlines three steps to take when installing solar PV:
  - Physical installation
  - Commission and turn on the solar PV system
  - Sell back excess solar energy generated (if applicable)

Enablers

- Availability of physical space for installation

Possible integrations

- IoT energy tracking and monitoring system

Roles & accountabilities

Business Owner: Sustainability
Product Owner: Sustainability
Champion: Sustainability

Myth: Solar panels are inefficient in generating energy

Majority of solar panels have an efficiency of 15 to 25%. While this may seem to be an inefficient rate of converting solar energy to electrical energy, an hour and half's worth of sunlight would be able to power the energy usage of the world for an entire year. Therefore, currently available commercial panels can provide sufficient energy to power your attraction's needs.

Case study: Renewable energy through solar panels (1 of 2)

Featured attraction: Singapore Discovery Centre

The Challenge

Initially, the attraction received power from the electric grid. With the motivation to reduce electricity costs for the centre, the attraction decided to switch to solar energy.

The team was considering a power purchase agreement or complete ownership of the solar panels. They decided to proceed with the latter due to a higher net present value.

The Solution

The solar panels generate renewable clean energy from the irradiance of the sun. The energy provides power for the daily operations of the attraction.

Currently, approximately 65% of monthly energy is provided by the solar PV system. The implementation was championed by the chairman of the board, the attraction's executive director and supported by the Centre Management Department.

The PV systems were installed along 8 locations including the rooftop, alfresco and cafeteria/laser tag area among others. The gross floor area was approximately $5000\ \mathrm{m}^2$ and it took approximately one year for installation. Since the installation was performed during COVID, the team had to obtain permission from relevant authorities to proceed.

Results

- An approximate **65% reduction in cost of energy**. This was especially beneficial since energy prices shot up in 2022.The payback period is approximately **6 years.**
- **Awarded the longest sheltered walkway fitted with solar panels** in the Singapore book of records in 2022.
- **Launched several programmes & tour offerings** that use the solar panels as a point for starting the conversation on climate change & sustainability.
- **Awareness of energy sources and costs helped the organisation drive key behavioural changes that led to greater energy conservation, sustainability, and responsibility:**
  - Encouraging energy conservation and fostering a culture of responsibility: When staff understand the impact of their actions on energy consumption and costs, they are more likely to conserve energy by turning off lights and equipment when not in use, adjusting thermostats, and reducing unnecessary energy use. This gives rise to a shared commitment to energy conservation and culture of responsibility and sustainability in the workplace.
  - Promoting sustainability: Staff are driven to adopt more sustainable practices when they are aware of the impact of their actions on the environment, and the importance of sustainability.

Case study: Renewable energy through solar panels (2 of 2)

Featured attraction: Singapore Discovery Centre

Considerations

- Ownership vs. Power Purchase Agreement (PPA): Analyse the financial implications of owning the solar system versus entering into a PPA. Ownership may provide greater long-term savings but requires upfront capital and ongoing maintenance. A PPA eliminates upfront costs and transfers maintenance responsibility to the provider, but may result in higher costs over time. Useful decision metrics include Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period and Levelised Cost of Energy (LCOE).
- Performance Metrics: Monitor key performance indicators (KPIs) to assess the effectiveness of the solar system. Important KPIs include energy yield, performance ratio, and system availability. Regularly evaluating these metrics will help identify potential issues and opportunities for improvement.
- Training and Education: Ensure that staff are well-trained in the operation and maintenance of the solar system, as well as energy conservation practices. This will enhance the overall effectiveness of the renewable energy initiative.
- Have a clear vision and support by the board and management to facilitate the project and showcase a good payback period to underpin project success.

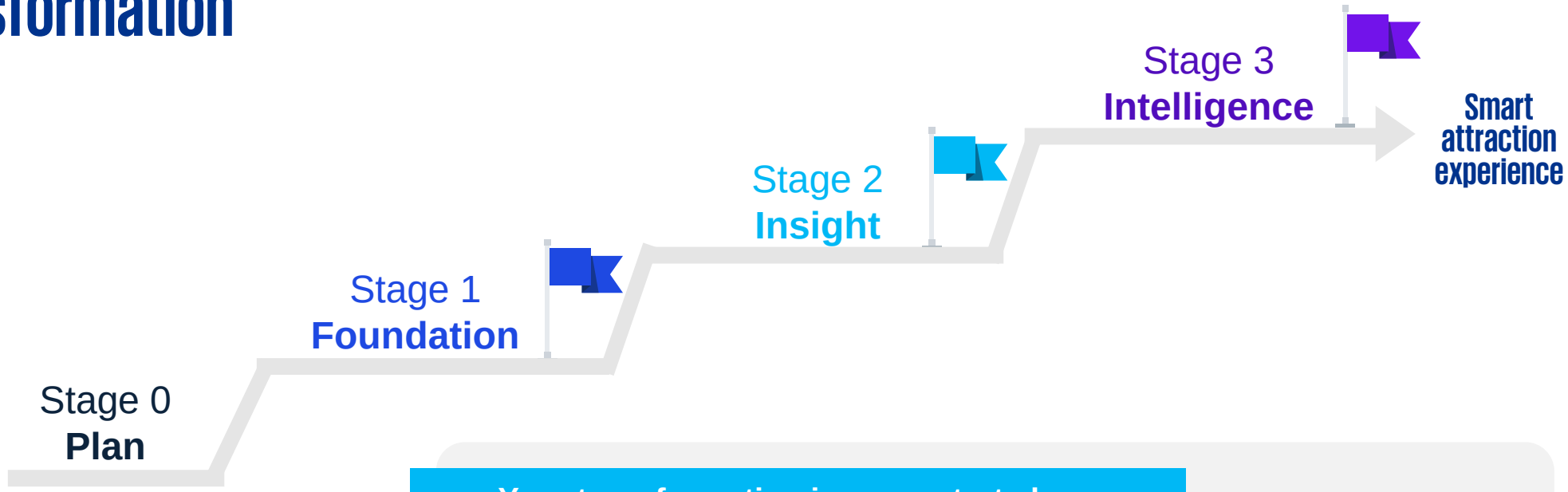
Considerations (continued)

- Site Assessment: Conduct a thorough site assessment to evaluate the available space, orientation, and solar potential. Inadequate site assessment can lead to suboptimal system design and reduced energy generation.
- System Design: A poorly designed solar system can result in inefficiencies and reduced power output. Work with qualified professionals and to design a system that meets your energy needs and maximizes efficiency.
- Equipment: Invest in high-quality and efficient solar panels, inverters, and mounting systems to ensure long-term performance, efficiency, and durability. Low-quality equipment from unknown vendors may result in frequent maintenance and reduced energy generation.
- Monitoring and Maintenance: Establish a regular monitoring and maintenance schedule to ensure optimal performance. Neglecting these activities can lead to decreased efficiency, reduced energy generation, and potential safety hazards.
- Regulatory and Permitting Issues: Be aware of regulations and permitting requirements for solar installations. Engage a Qualified person to advise. Non-compliance can result in delays, or even project cancellation. Examples of agencies include SCDF, BCA, NParks, URA, LTA, PUB etc.

06

Getting started

Define a digital roadmap and business case to commence your transformation



Identify current state of digitalisation

- Define maturity level using Tourism Transformation Index (TXI)
- Develop digital transformation vision and goals
- Develop a digital roadmap and business case for transformation

Your transformation journey starts here

Define maturity level

Do a self-assessment

Tourism Transformation Index

to determine your digital maturity level

Develop digital transformation vision and goals

Review business capabilities and skill gaps

Develop business case

Cost-benefit analysis including available grants to offset transformation cost

Available support as you progress on your smart attraction journey (1 of 6)

Business Improvement Fund (BIF)

Singapore Tourism Board (STB)

The BIF aims to encourage technology innovation and adoption, redesign of business model and processes in the tourism sector to improve productivity and competitiveness.

Eligibility criteria includes…

- Open to tourism companies taking on a capability development initiatives
- The initiative helps the attraction to upgrade the business or innovate, under two pillars of 'Core Capabilities' *(e.g. business strategy development)* and 'Innovation and Productivity' *(e.g. adoption of technology solutions)*

This may apply to you if…

- You are undertaking a project in:
  - Core Capabilities – help you prepare for growth and transformation by strengthening business foundations
  - Innovation and Productivity – explore new areas of growth or enhance efficiency through redesigning workflows and processes
  - Support level is 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

Productivity Solutions Grant (PSG)

Enterprise Singapore (ESG)

This grant supports companies keen on adopting IT solutions and equipment to enhance business processes. It provides financial support for business owners to adopt pre-scoped IT solutions, equipment and consultancy services to improve productivity.

- SME*s only

**Definition of SME:*

- *You are a business entity registered and operating in Singapore with at least 30% local shareholding*
- *Your group sales turnover not more than S$100 million per annum, or group employment size not more than 200 employees*

- You are purchasing pre-approved IT solutions listed in the PSG solutions such as pre-approved vendors for digital marketing and cybersecurity

Information accurate as of 12 Oct 2023

Available support as you progress on your smart attraction journey (2 of 6)

Eligibility criteria includes…

This may apply to you if…

CTO-aaS

IMDA

*This programme aims to help SME*s gain access to digital consultancy services provided by digital consultancy operators appointed by IMDA.*

**Definition of SME:*
- *You are a business entity registered and operating in Singapore with at least 30% local shareholding*
- *Your group sales turnover not more than S$100 million per annum, or group employment size not more than 200 employees*

- Registered and operating in Singapore;
- Minimum of 30% local shareholding;
- Enterprise Group Annual Sales Turnover not more than S$100 million per annum, or Enterprise Group Employment Size of not more than 200 employees; and
- Has not used the services of CTO-as-a-Service digital consultancy previously.

- You require digital advisory services, e.g. digital needs analysis, digital solutions recommendations, basic cybersecurity etc.
- You require project management services for implementation of digital solutions, e.g. project implementation plans, business process re-engineering etc.

Training Industry Professionals in Tourism (TIP-iT)

Singapore Tourism Board (STB)

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.

- Proposed projects should fall under one of the following categories:
  - Employee Upgrading (Training & Course Development)
  - Leadership Development

- You are keen on attending training and in-house course development in relevant skill sets, e.g. digitalisation, data analytics and sustainability
- Up to 50% funding on qualifying costs which includes course fees, COLA, Absentee payroll, etc.

Information accurate as of 12 Oct 2023

Available support as you progress on your smart attraction journey (3 of 6)

Eligibility criteria includes…

This may apply to you if…

Tcube Learn

Singapore Tourism Board (STB)

Know your transformation readiness and build tech capabilities

e.g. Tourism Transformation Index (TXI), Tcube Content & Events, Data College

- Open to all tourism businesses
- TXI is developed for Singapore-based tourism organisations. To ensure TXI score is an accurate representation of the organisation's actual state of transformation, it is encouraged for TXI survey to be taken by the organisation's senior management on a regular basis.

- You want to uncover your company's barriers to digital transformation
- You want to equip your team to lead the change and build capabilities in data analytics, innovation and technology
- You want to shortcut the learning curve through thought leadership resources, Tcube transformation stories and community events

Tcube Test

Singapore Tourism Board (STB)

Bring ideas to life through experimentation

e.g. Singapore Tourism Accelerator, Data Analytics Shift Programme (DASH), Tcube Innovation Programme

- Open to all tourism businesses

- You want to validate the business use-case of technology through Tcube's consultancy and prototyping services
- You want to embark on a pilot project that helps address business challenges and open up opportunities
- You require training in data analytics skills, and guidance to plan and implement data projects

Information accurate as of 12 Oct 2023

Available support as you progress on your smart attraction journey (4 of 6)

Eligibility criteria includes…

This may apply to you if…

Tcube Build

Singapore Tourism Board (STB)

Leverage STB's tech resources

e.g. Singapore Tourism Analytics Network (Stan), Tourism Information & Services Hub (TIH)

- Open to all tourism businesses

- You want to access a wealth of tourism data and better power decision making with Stan
- You want to access up-to-date content on Singapore's tourism offerings, travel software services and much more with TIH

Tcube Tech Directory

STB

Serves as a diverse repository of global and local innovative technology companies and solutions that can shortcut the search process and address pain points and challenge areas of tourism businesses

- Open to all tourism businesses

- You are keen to search for innovative tech solutions providers.
- Sign up for an account to gain full access to the Tech Directory (housed on IMDA's Discovery Engine platform). You may find relevant hospitality solutions under the "Lifestyle cluster" filter, or look to other solutions available that have cross-adjacent use cases for various sectors.

Information accurate as of 12 Oct 2023

Available support as you progress on your smart attraction journey (5 of 6)

Eligibility criteria includes…

This may apply to you if…

Better Data Driven Business (BDDB)

IMDA

Develop data capabilities for business practices

- SMEs/Data infant companies
- Should have explored, collected or stored some digitised data, e.g. CRM etc.
- Have not used digital solutions before

- You are keen on building data capabilities for consumer insights, deepen business intelligence and data analytics capabilities
- You wish to learn how to collect data safely and combine or integrate data across systems

SME Go Digital

IMDA

*Building digital capabilities for SME*s*

- Dependant on type of Go Digital solution, but most require companies to be
  - SMEs
  - Minimum of 30 percent local shareholding
  - Registered and operating in Singapore

- [Start Digital] You are keen on establishing foundational digital solutions, e.g., telecommunication, banking etc.
- [IDP] You wish to identify suitable digital solutions for each stage of your digitalisation journey, these solutions are usually identified after IDP has been developed
- [Grow Digital] You are ready to internationalise and onboard with B2B and B2C e-commerce platforms

**Definition of SME:*
- *You are a business entity registered and operating in Singapore with at least 30% local shareholding*
- *Your group sales turnover not more than S$100 million per annum, or group employment size not more than 200 employees*

Information accurate as of 12 Oct 2023

Available support as you progress on your smart attraction journey (6 of 6)

Digital Leaders Programme

IMDA

Accelerate growth of digitally progressive local companies

Eligibility criteria includes…

- Non-ICT companies
- Companies that have made some progress to digitalise or have sufficient digital maturity and strong digital mandate
- 30% local shareholdings

This may apply to you if…

- You are keen on building in-house digital capabilities and wishes to hire a digital team
  - These roles must be technology-driven roles, e.g., developer, AI & Data architect, UX/UI designers, data scientist/analysts
  - At least 50% of the digital team must be Singaporeans based in Singapore

Information accurate as of 12 Oct 2023

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Kiztopia

Mandai Wildlife Group

Marina Bay Sands

Mount Faber Leisure Group

National Heritage Board

Resorts World Sentosa

Singapore Discovery Centre

Straco Leisure

Skyventure VMT Singapore

Tomorrow Entertainment

Ultimate Airzone

07

Appendix

Technologies were prioritised preliminarily by the values assigned by attractions during the visioning workshop, within the stages

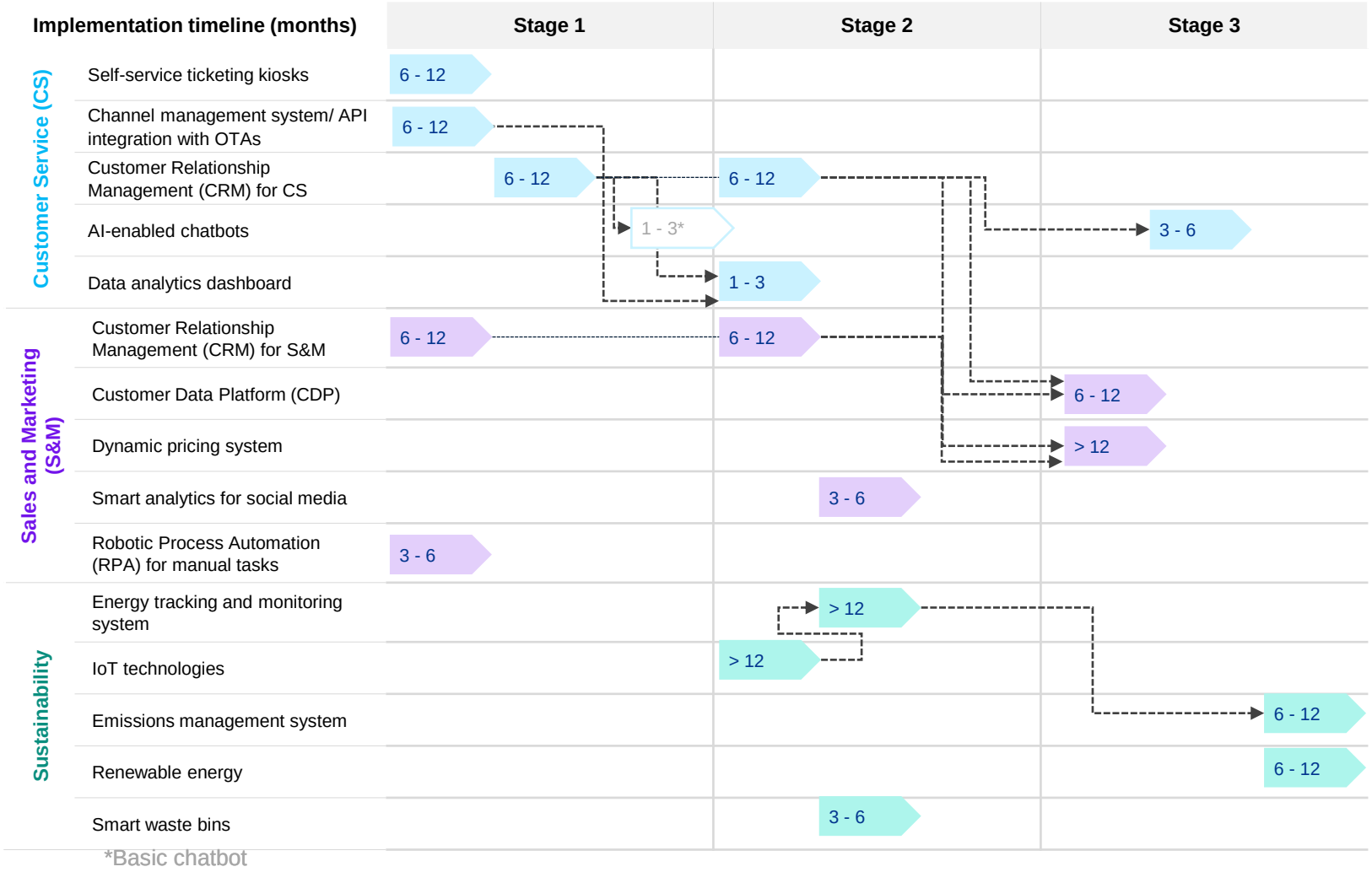
		Stage 1	Stage 2	Stage 3
Customer Service (CS)	Self-service ticketing kiosks	Strategic		
	API integration with OTAs	Strategic		
	Customer Relationship Management (CRM) for CS	Deprioritised		
	AI-enabled chatbots	*Discretionary		Discretionary
	Data analytics dashboard		Strategic	
Sales and Marketing (S&M)	Customer Relationship Management (CRM) for S&M	Strategic		
	Customer Data Platform (CDP)			Strategic
	Dynamic pricing system			Strategic
	Smart analytics for social media		Discretionary	
	Robotic Process Automation (RPA) for manual tasks	Strategic		
Sustainability	Energy tracking and monitoring system		Strategic	
	IoT technologies		Deprioritised	
	Emissions management system			Deprioritised
	Renewable energy			Deprioritised
	Smart waste bins		Discretionary	

*Basic chatbot

Final adjustments in prioritisation were made for technical dependencies between technologies

Estimated implementation time

Main dependency and/or inputs



Adjustments made for technical dependencies

Data analytics dashboards to commence after API integration with OTAs and CRM for CS: Dashboards to visualise customer data collected from various sources.

Chatbot to commence after stage 1 CRM for CS: CRM for CS to collect feedback and queries from chatbot.

No change: Inputs from CRM for S&M and CS required for dynamic pricing and CDP.

IoT technologies brought forward to start of stage 2: Energy tracking and monitoring and smart waste bins are dependent on IoT implementation.

No change: Inputs from energy tracking and management required for emissions management and renewable energy implementation.

Technology dependencies

	Technology	Dependencies
Customer Service (CS)	Self-service ticketing kiosks	None
	Channel management system/ API Integration with OTAs	None
	Customer Relationship Management (CRM) for CS	None
	AI-enabled chatbots	CRM for CS
	Data analytics dashboard	API integration with OTAs, CRM for CS
Sales and Marketing (S&M)	Customer Relationship Management (CRM) for S&M	None
	Customer Data Platform (CDP)	CRM for Sales and Marketing, CRM for CS
	Dynamic pricing system	CRM for Sales and Marketing, CRM for CS
	Smart analytics for social media	None
	Robotic Process Automation (RPA) for manual tasks	None
Sustainability	Energy tracking and monitoring system	IoT technologies
	IoT technologies	None
	Emissions management system	Energy tracking and monitoring system
	Renewable energy	None
	Smart waste bins	None

Change management approach

Managing change through a successful technology implementation requires understanding needs, impacts and challenges to proactively address these through each phase of the project.

Stage of technology implementation

	Analyse / Blueprint	Design	Prepare	Deploy
Change Readiness	*What are the **people challenges and risks** and how do we prepare for them?*	*What specifically is changing and what is the **impact to each role**?*	*How do we effectively **transition each person** to ensure they are prepared?*	*How do we continue to **monitor people challenges** and address them?*
Communication	*What are the key messages and what is the **plan to consistently communicate**?*	*What are the **messages and engagement** opportunities to get the right people prepared for the change?*	*What specific **information is required for each role** and organization so they're ready to transition?*	*How do we tell people what's working, what needs **improvement**, and when **success** is being achieved?*
Training	*How are we going to **approach training**, what are the constraints and how will it be delivered?*	*What are the specific **training needs and skill gaps**?*	*What roles need to take which **training courses**?*	*Are the right people taking the right training and **is it effective**? Is additional training needed?*
Organisational Design	*What does **current state** organisation look like and what are the **future state guiding principles/ needs**?*	What is the **future state design** – structure, headcount, KPIs and governance, roles?	*How do we ensure **people are matched to roles** in the new structure?*	*What else will enable **transition** to the new organisational design and create high performance?*

Stakeholders involved in change management

Change Management Team (Lead and Consultant)

- Assess the scope of the project
- Develop and implement change management strategies and plans that maximise employee adoption and usage of technology
- Develop KPIs that are aligned with benefit realisation, value creation and ROI
- Support and coach stakeholders and end-users through transition and adoption of the new technology
- Support communication efforts by enabling design, development and delivery of key communications
- Conduct impact analysis, assess change readiness and identify key stakeholders

Client Team

- Training – responsible for developing training materials to increase know-how within end users
- Communications – responsible for communicating key decisions and keep stakeholders informed
- Technical Support – tackle and hiccups experienced by end-users to minimise resistance to change
- Product Owner – develop the product and ensure it is aligned with business goals. Ask for regular inputs from end-users to keep them in the loop and address their pain points

PDPA Guidelines for Businesses

Category	PDPA governs the collection, use and disclosure of personal data. The 7 main obligations for businesses to adhere to are as below:
Consent	Your business can collect, use and/or disclose only the personal data of individuals who have consented to such collection, use and/or disclosure.
Purpose Limitation	Your business can collect, use and/or disclose only the personal data of individuals for the purpose(s) for which consent have been given by these individuals.
Notification	Your business must inform individuals of the purpose(s) for which their personal data is being collected, used and/or disclosed.
Protection	Your business must put in place reasonable security measures to protect the personal data in its possession or control, including the storage medium or devices on which such personal data is stored.
Retention Limitation	Your business should retain the personal data for only as long as is necessary for business or legal purposes.
Data Breach Notification	If your business has suffered a data breach that has caused (or is likely to cause) significant harm to affected individuals, or that has affected at least 500 individuals, then it generally must inform the Personal Data Protection Commission (PDPC) and affected individuals of the breach.
Accountability	Your business must implement the necessary policies and procedures to fulfil its PDPA obligations. It must make information about such policies and procedures publicly available.

Cybersecurity measures are crucial to safeguard attractions' businesses and protect their customers (1 of 2)

Cybersecurity measures to protect data should be incorporated into the planning from the **early stages of digital adoption**, rather than later as an afterthought so as to enhance customers' trust and loyalty.

As threats from cyber criminals grow in scale and sophistication, attractions have to effectively employ cybersecurity measures and develop capabilities to defend against cyber attacks. Investing in cybersecurity can help place attractions in a better starting position to fully take advantage of digital transformation and confidently grow in the evolving landscape.

According to the Cyber Security Agency of Singapore, cyberattacks show no signs of slowing down with the rise of data breaches and ransomware targeted at organisations in Singapore. Attractions should ensure that proper security controls are implemented to protect the data and have secure settings in the digital landscape.

3 main goals of a comprehensive security management:

1. Confidentiality: Preventing unauthorised access of private information
2. Integrity: Keeping data accurate, consistent and secure over its life
3. Availability: Ensuring timely and reliable access to data and systems

3 phases to consider:

1. Preparation (Before incident)
2. Response (During incident)
3. Recovery (After incident)

Areas to oversee	What to look out for
01 Hardware assets	• Protect from viruses and malware • Protect against data breaches and data leak • Data backup • Network hosting to IoT devices and the rest of the enterprise network
02 Software assets	
03 Data	

Source: IMDA Cyber Security report, CSA

Cybersecurity measures are crucial to safeguard attractions' businesses and protect their customers (2 of 2)

Cybersecurity considerations

Use this list to review your cybersecurity maturity and identify gaps.

- **Leadership and Governance:** Does the leadership have a cybersecurity strategy? Does the leadership demonstrate the ability of taking ownership and effectively manage risk?
- **Human Factors:** Is there a security culture that exists to empower and ensure that employees are properly trained and understand the nature of cybersecurity and their role in protecting against threats?
- **Information Risk Management:** Is there a standardised approach to thoroughly and effectively assess, manage and monitor risks associated to sensitive or confidential information?
- **Business Continuity and Crisis Management:** Are there capabilities in place to ensure overall business continuity, crisis communication and mass notification processes to defend and recover against cyber attacks?
- **Operation and Technology:** Are there technical and operational control measures implemented to address identified risks?
- **Legal and Compliance:** Are we able to demonstrate compliance with cybersecurity regulations?

Source: IMDA Cyber Security report, CSA

Appendix – Types of API integrations

Brief explanation of types of API Integrations*

Types of API architecture

1. Representational State Transfer (REST)

- ✓ Client-Server Separation
  - For all interactions, client must request and the server will thereafter respond. The server cannot request and the client cannot respond
- ✓ Uniform Interface
  - All request and responses must occur through the HTTP communication protocol
  - Responses are formatted in JavaScript Object Notation (JSON)
- ✓ Stateless
  - Every interaction is independent, and data from each interaction is not stored on server
- ✓ Cacheable
  - Server responses must indicate if client can store provided resource, and the duration of storage

2. Simple Object Access Protocol (SOAP)

- ✓ Messaging standard defined by the World Wide Web Consortium
- ✓ Utilises only XML data format to send requests and responses
- ✓ Rigidly defines content and method of sending requests and responses
  - Securer than REST but harder to implement due to rigidity
- ✓ Can be used over any communication protocol

3. Remote Procedural Call (RPC)

- ✓ Invoke executable processes → Execute code scripts on servers
- ✓ Do not facilitate transfer of data unlike REST and SOAP

Types of API protocols

JavaScript Object Notation (JSON)

- ✓ Encoded in JSON
- ✓ Commonly utilities HTTP communication protocol
- ✓ Able to send data to server that does not require a response
- ✓ Able to send multiple calls at once, and responses can be sent asynchronously
- ✓ Supports only alphanumeric and text data exchanges

Extensible Markup Language (XML)

- ✓ Encoded in XML
- ✓ Only uses HTTP communication protocol
- ✓ Handles wider range of data, including texts and images

** Depends on the range of integrations that chosen OTA provides*