ANNEX B – EXAMPLES OF SOLUTIONS IN-DEMAND BY SECTORS

1. Dental

The demand for healthcare services and higher service levels has been on the sharp rise in recent years. To cope with these rising needs, it is essential for the Dental Clinics to be operating at higher efficiency. Clinic Management Systems allows the clinic to manage patient records at ease, integrating with X-Ray/Scan machines to further automate patient record reconciliation, as well as interfacing with Community Health Assistant Scheme (CHAS) and Medisave for claim submission. The patient records should also be in line with common standards and future proof for National Electronic Health Records.

The scope of the solution for the dental clinics shall include but not be limited to the following:

1.1. Dental Clinic Management System

a) Allow automated appointment booking and reminders (e.g. Web-based appointment scheduling, automated email/SMS reminders on upcoming appointments).
b) Allow management of patient data and dental records (e.g. register new patient, create/update patient records, etc).
c) Provide allergy warning based on patient records (e.g. anaesthetics, painkillers).
d) Provide billing management to generate invoice/bill and electronic payment methods.
e) Enable integration with commonly used accounting software.
f) Enable inventory management (e.g. Stock expiry and level monitoring).
g) Provide a easy means of reporting on clinic operations/sales performance, and raise red flags based on configurable triggers (e.g. dashboard).

h) Provide a database to maintain list of corporations/companies participating in employee benefit scheme.

i) Enable equipment integration, automatically capture equipment readings/diagnostics directly into patient records (e.g. x-ray scans).

j) Facilitate clinics to generate reports for claims submission to government agencies (e.g. CHAS and Medisave).

1.2. Additional Requirements

a) Provide a knowledge-based system to suggest suitable treatment plan, view and prioritise plans.

b) Consortia may consider using common standards for Electronic Dental Records (EDR) to facilitate future integrations to National Electronic Health Record (NEHR).

c) Integrate and/or automate procurement process with supplier for order replenishment.

d) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.

e) Shortlisted Consortia must work in consultation with Singapore Dental Association and relevant government agencies to refine project details.

2. Landscaping

In the landscape sector, the identified challenges faced by the landscape companies today are the shortage of landscaping manpower and the companies' ability to monitor day-to-day landscape operations and report work progress to their service buyers. To help address these concerns, there is a pressing need to raise the productivity of landscape companies by adopting a Total Landscape Operation Management System that aims to "achieve more with less", and at the same time better collaborating with their service buyers to meet their expectations. The key enablers would include capability of real time mobile monitoring, document and report management, and data exchange with service buyers through system interface.

The scope of the solution for the landscaping companies shall include but not be limited to the following:

2.1. Landscaping Management System

a) Provide project management to schedule manpower and resources, analyse and highlight job dependencies.
b) Enable real-time job based on work orders from ground-staff.
c) Enable resource tracking (e.g. integration with fleet management system, track inventory/consumables level at mobile sites).
d) Provide reminders on mandatory equipment compliance check deadlines (e.g. motor vehicle inspection, man-carrying equipment).
e) Enable document versioning and repository for tracking design changes, and store documents for internal and external circulation.
f) Allow tracking and notification on foreign manpower (Work permit expiry, foreign worker quota).
g) Enable ground-staff to exchange information with main office on job done or job updates in real-time through mobility solutions (e.g. smartphones).

h) Allow ground-staff to conduct attendance taking, toolbox meeting, and checklist taking directly into database without re-entering data (through mobile devices).

i) Generate reports automatically for submission to service buyers upon job completion within same working day.

j) Facilitate communication with service buyers by complying with service buyers' working process.

2.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.

b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.

c) Shortlisted Consortia must work in consultation with National Parks, Landscape Industry Association (Singapore), and the relevant associations to refine project details.

3. Private Education

The private education sector has been improving the quality of their courses and learning outcome of their students following the introduction of the Private Education Act in 2009. However, many private schools are not equipped with ICT solutions with strong analytical capabilities that can enhance teaching and learning outcomes or help private school operators better manage their operation and identify critical "bottlenecks" for timely interventions.

The scope of the solution shall include but not limited to the following:

Learning and/or Analytics Systems

3.1. Learning, Assessment and Analytics Platforms

a) Allow users to add or customise content to tailor to students' learning needs and outcomes.

b) Provide a scalable platform for users to upload and edit content.

c) Provide a scalable platform for extensive database of assignments and assessments.

d) Contain adaptive algorithms that adjust content and assessments based on the students' understanding of the subject matter. The adaptive algorithm should also be able to refer weaker students for additional revisions or practice.

e) Provide for the measurement, reporting and analysis of learning and assessment data:

i. To monitor and review the performance of student and class relative to the learning objectives.

ii. To track students' academic progress and review development process in real-time (e.g. progression rate, attrition rate, identify students who are at risk of dropping out of the course).

iii. To identify the learning concepts that students struggle with so that teaching staff can take timely interventions.

a) Provide accessibility across a variety of mobile devices such as tablets and smartphones.

b) Users may use their discretion to source for a more comprehensive solution that provides optional functionalities to further enhance students learning outcome. Below are some examples:

   i. Simulated virtual lab environments that will aid teaching and learning.

   ii. Functionalities that allow academic staff to record lectures for after-class self-review.

   iii. Functionalities that allow students the ability to search and re-learn subject matter.

3.2. Business Intelligence Analytics Platforms

a) **(Reporting)** Creates formatted and interactive reports on demand, with highly scalable distribution and scheduling capabilities.

b) **(Dashboards)** Publishes web-based or mobile reports with intuitive interactive displays that indicate the state of a performance metric compared with a goal or target value (e.g., student academic performance, student feedback on academic staff, student feedback on student support infrastructures and services, student complaint indicators, staff performance indicators, business performance indicators, etc).

c) **(Online analytical processing)** Analyses data with fast query and calculation performance.

d) **(Interactive visualization)** Displays numerous aspects of the data more efficiently by using interactive pictures and charts, instead of rows and columns.

e) **(Microsoft Office integration)** Integrates with Microsoft Office, including support for document and presentation formats, formulas, data "refreshes" and pivot tables. Advanced integration to include cell locking.

f) **(Search-based BI)** Searches structured and unstructured data sources and map them into classification architectures with a user-friendly interface.

g) **(Mobile BI)** Delivers analytic content to mobile devices in a publishing and/or interactive mode.

h) Users may use their discretion to source for a more comprehensive solution that includes optional functionalities to analyse trend data and take appropriate actions for negative trends. Below are some examples:

i. **(Predictive modelling and data mining)** Classifies variables based on proven mathematical algorithms.

ii. **(Scorecards)** Interprets the metrics based on predetermined key performance indicators (KPIs) or strategic objectives.

iii. **(Prescriptive modelling, simulation and optimization)** Supports decision-making by enabling organizations to select the correct value of a variable based on a set of constraints for deterministic processes, and by modelling outcomes for stochastic processes.

4. Early Childhood Development

The early childhood sector will expand rapidly over the next five years to meet the demand for pre-school services in Singapore. The Early Childhood Development Agency (ECDA) in Singapore will roll out more child care centres, ensure the steady stream of pre-school teachers, while also ensuring that it continues to be affordable to every family that needs it. All this is encapsulated in the three words of 'accessibility', 'affordability' and 'quality', and the aim here is to give every child a good start in life.

This 'good start' is not only a function of providing children access to these services, but it is also a function of the quality of the experience, which includes the quality of the programs offered, the teachers on hand, and how all this somehow integrates to produce a child who is holistically developed. ICT plays a part in this experience, and can be a significant enabler in the child's holistic development. For instance, it can make operations more efficient for centres and teachers, creating capacity for them to focus on activities that relate more directly to the child's development; it can lower costs for the centre which helps keep fees affordable; it can aid in the way teaching and learning is conducted in the classroom etc. In that sense, ICT can be a significant enabler to the pre-school experience. To further flesh out the above:

4.1. Early Childhood Development Solutions should be able to do the following:

Enabling Centres

a) Provide management or analytic tools for centre leaders to plan, monitor and evaluate programmes and processes to better meet regulation and licensing requirements;
b) Support quality certification of centres through knowledge management and communication tools;

c) Support better utilisation & sharing of resources through resource management tools.

Empower Teachers

a) Support continuous professional development for teachers through E-learning and/or mobile learning;
b) Provide a platform for Professional Learning Circles through online repositories and a networked system;
c) Enable monitoring and tracking of professional development and improve teachers' quality.

Engage Children

a) Support children's development by identifying areas of weakness, supporting and extending children's learning;
b) Provide learning management & assessment tools for continuous evaluation and assessment of lessons;
c) Provide a platform for the centre to record, monitor and evaluate children's learning that are done through e-resources and other online platforms

4.2. Additional Requirements

a) Shortlisted Consortia must work in consultation with the Early Childhood Development Authority (ECDA) and relevant associations to refine project details;
b) Information on different learning areas and frameworks may be obtained from the EDCA website;
c) Pre-school school operators may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.

5. Location-Based Shopping

The perennial issue faced by physical shop retailers is the inability to attract window shoppers into their stores. With the increasing penetration of smartphones and tablets, location-based shopping offers retailers an opportunity to increase footfall into their shops by pushing existing promotions and offers to customers in the vicinity, allowing the retailers to take one step further in customer engagement. With the right marketing message sent to the right customer in the right place and at the right time, customers' overall shopping experiences are enhanced and retailers' productivity and revenue can also be improved.

The scope of the solution for the retailers shall include but not be limited to the following:

5.1. Location-Based Shopping Solution

a) Provide indoor user position triangulation and identification (e.g. WiFi hotspots, apps on user devices such as smartphone).
b) Allow shopper to subscribe/opt-in to alerts (e.g. notifications on smartphones, sms, emails).
c) Provide dynamic advertising through interactive billboard to push promotions (e.g. NFC tags, QR codes).
d) Allow scheduling of promotions, offers and events.
e) Generate reports to track efficiency of location-based shopping services (coupons downloaded, purchased or redeemed).
f) Provide analytics on current shopping trends (location, profile, brands, preference, time of day for visit).
g) Enable integration with common ERP modules such as inventory management (to provide live update on limited stock/edition goods).

5.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.

b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.

c) Shortlisted Consortia must work in consultation with SPRING Singapore and the relevant associations to refine project details.

6. Food Catering

In the food catering sector, the need for better integration and consolidation of data are the key impetus driving catering companies to expand ICT usage in their daily work. Key identified areas to be addressed include the ability to assist the companies to handle customised menus, optimise delivery routes and integration to existing accounting systems.

The scope of the solution for the food caterers shall include but not be limited to the following:

6.1. Catering Management System

Sales and Order Management Module

a) Allow various channel for online ordering (e.g. via internet or mobile).
b) May provide online payment methods such as NETS, Visa and MasterCard.
c) Enable electronic menu with ability for admin / sales person to easily create new set menus for ordering or customised menus for individual customers.
d) Ability to generate online, email or SMS quotations, confirmation and invoices for orders.
e) Allow online order self-management by customers, such as change of orders, change of timing, addition of specific requirements.
f) Integration with Inventory and Procurement Modules for the order fulfilment.
g) Integration with existing and commonly used Accounting systems for tracking of revenue.

Procurement Module

a) Integration with sale and order management module to estimate and auto generate food supplies requirement for order fulfilment.
b) Enable confirmation of food supplies requirement; confirmation process shall be customisable to meet the operational process of each company

c) Auto-generation of Purchase Order (PO) to identified list of food suppliers, or enable integration to existing e-procurement portals.
d) Auto-generation of online Delivery Order (DO) verification for receipt of deliveries.
e) Integration with Inventory Modules to populate deliveries received into inventory system for stock tracking.
f) Integration with existing accounting systems for tracking of expenses.

Inventory Module

a) Allow the real time update of inventory via integration with Sales and Order Management and Procurement modules, i.e. inventory updated when orders are fulfilled or inventory is stocked up.
b) Enable reminder function when inventory level reached a pre-set low level.

Kitchen Module

a) Allow orders to be fulfilled for the day to be consolidated and translated food preparation by kitchen staff.

Logistic Module

a) Auto-generate and optimise delivery schedules according to pre-set criteria such as destination, delivering time, menu type or order size.
b) Ability for manual intervention for adjustment of delivery schedules.
c) May provide ability for tracking of delivery trucks and status of food deliveries for customer service officers.

Customer Relationship Management Module

a) Enable customer feedback and history tracking for better customer servicing.
b) Ability to create and manage marketing campaigns to customer database for promotions.

c) Ability to auto-generate promotions to specific customer for special occasion or based on customer's order history.

Business Analysis Module

a) Provide analytic tools and reports to enable improved operations or sales performance e.g. customer segmentation reports and inventory vs sales reports.

Workforce Management Module

a) Provide integrated time management system comprising functions such as e-leave, payroll, time and attendance and shift scheduling with generation of labour costing reports.

6.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.
b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.
c) Shortlisted Consortia must work in consultation with Association of Catering Professionals Singapore and the relevant associations to refine project details.

7. Food & Beverage (Dine-in)

For food & beverage (F&B) outlet owners, the shortage of service staff is impacting the service level that they can provide to their customers, as well as, their ability to scale up their operations. Key identified opportunities in the sector would be to enable self-servicing for dine-in customers with integration to existing Point of Sales (POS) systems.

The scope of the solution for the F&B restaurants shall include but not be limited to the following:

7.1. Self-service Menu Ordering Solution for Dine-in

Menu Ordering Module

a) Enable electronic menu on electronic devices such as iPads, Android tablets or mobile devices for customer self-ordering when dining within the outlets.
b) Ability for pre-ordering while queuing would be preferred.
c) Ability for customers to add new orders to existing orders and review food readiness status.
d) Auto-transmission of confirmed orders to kitchen (Kitchen Module) and existing POS systems.
e) Ability for admin person to easily add in new set menus / dishes or create promotions of the day.
f) Integrated with wireless / mobile payment terminals to enable card payment by customer at table.

Kitchen Module

a) Allow menu orders to be displayed to the kitchen for food preparation.
b) Enable tracking of food readiness status (e.g. pending order, in preparation, ready) with possible feedback of such status to customers via the Menu Ordering Module.

Customer Relationship Management Module

a) Enable up-selling through recommendation based on promotions available, related food items or aggregated order trends.

Business Analysis Module

a) Provide analytic tools or reports to aid up-selling, menu planning and promotions.

Workforce Management Module (optional)

a) Provide integrated time management system comprising functions such as e-leave, payroll, time and attendance and shift scheduling with generation of labour costing reports.

7.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.
b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.
c) Shortlisted Consortia must work in consultation with the relevant agencies and associations to refine project details.

8. Food & Beverage (Quick Service)

For quick service food & beverage (F&B) outlet owners, it is important that food are prepared and delivered quickly to customers in the queue for take-away. Key identified opportunities in the sector would be to enable self-servicing for quick service F&B outlets with integration to existing Point of Sales (POS) systems, so that staff need not be dedicated to take orders from customers and can help out with food preparation and delivery.

The scope of the solution for the F&B quick service outlets shall include but not be limited to the following:

8.1. Quick Ordering Solution

Quick Ordering Module

a) Enable electronic menu on electronic devices such as iPads, Android tablets or mobile devices for customer self-ordering when queuing.
b) May include collection queue number management for self-collection.
c) Auto-transmission of confirmed orders to kitchen (Kitchen Module) and existing POS systems.
d) Ability for admin person to easily add in new set menus / dishes or create promotions of the day.
e) Integrated with payment terminals to enable card payment (e.g. NETS, EZ-Link, Visa and MasterCard) by customers.

Kitchen Module

a) Allow menu orders to be displayed to the kitchen for food preparation.
b) Enable tracking of food readiness status (e.g. pending order, in preparation, ready) and may include notification for self-collection when food is ready.

Business Analysis Module

a) Provide analytic tools or reports to aid menu planning and promotions.

Workforce Management Module (optional)

a) Provide integrated time management system comprising functions such as e-leave, payroll, time and attendance and shift scheduling with generation of labour costing reports.

8.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.

b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.

c) Shortlisted Consortia must work in consultation with relevant government and associations to refine project details.

9. Jewellery

The Jewellery sector is largely still reliant on manual processes for stock tracking and inventory management. The various settlement modes such as settlement in gold and cash between the Jewellers and their suppliers also meant that their Point of Sales (POS) systems and accounting systems would require to be customised to handle the varied modes. Key identified areas in the sector would be to provide ability for the Jewellers to efficiently track their stock movements, as well as ability to enable its accounts systems to take into consideration the various settlement modes.

The scope of the solution for the Jewellery companies shall include but not be limited to the following:

9.1. Jewellery Management System

Procurement Module

a) Allow electronic procurement function (create purchase entry, place work order).
b) Enable search function to get suppliers' information and available goods.
c) Integration with Inventory Modules.

Inventory Module

a) Allow the real time updates of the stock level (e.g. update the inventory when goods are purchased).
b) Enable reminder function when inventory level is low.
c) Enable RFID technology to allow fast stock check.
d) Integration with Procurement Module and Sales Module.

Sales Module

a) Allow discount measures to be recorded (e.g. percentage of discount, type of promotion).
b) Enable the certificate generating and printing process.

c) Integration with POS System to capture daily sales record (e.g. item number, sales person, date of purchase, etc).

Payment Module

a) Allow bill generation and printing process.
b) Enable various payment processes (accept cash or electronic payment).
c) Enable integration with commonly used accounting software.

CRM Module

a) Provide customer relationship management function (e.g. record member type, search member, email/SMS promotion reminder, generate comprehensive report).

Business Analysis Module

a) Provide analytic tools to aid business operation forecasting (e.g. sales analysis by sector, salesperson and other dimensions).

9.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.
b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.
c) Shortlisted Consortia must work in consultation with the Singapore Jewellers Association and relevant government agencies to refine project details.

10. Travel Agents

Retail travel agents' back-end operations are largely paper-based and heavily reliant on manual processes to manage inventories and reservations. In retail transactions, these are primarily face-to-face in 'brick and mortar' establishments. The three key challenges faced by travel agents today are the inability to (i) enable online transactions; (ii) respond fast enough to customers' enquiries; and (iii) track and analyse purchase patterns and client's preferences. In order to overcome these challenges, travel agents can automate and streamline their back-end operations and introduce e-Commerce functionality through an integrated Travel Agent Management Platform.

The scope of the solution for travel agents shall include but not be limited to the following:

10.1. Integrated Travel Agent Management Platform

Inventory Management

a) Provide inventory control and management between various suppliers (e.g. hotels, tours, cruises) and aggregate them to a centralised database.

Reservation Management

a) Enable end-to-end management of customer reservations (system should be able to confirm reservation in real-time, check inventory for availability and update relevant databases upon confirmation).

Client and Supplier Payment Management

a) Enable multiple electronic payment modes (e.g. credit/debit cards, PayPal) for consumers and suppliers through the e-Commerce/e-Accounting platform.

Customer Relationship / Promotion Management

a) Allow for Customer Relationship / Promotion Management through the e-Commerce platform. Travel agent should have a record of all their customers and transaction information.

Data Reporting and Analytics

a) Provide a dashboard to report customer and sales data e.g. spending patterns, customer demographics etc.
b) Provide data-driven insights to support travel agents in making better business planning, product design and marketing decisions.

e-Commerce Platform

a) Provide an e-Commerce platform (e.g. B2B, B2C, m-commerce) supporting multiple functionalities (e.g. real-time quotation, online payment, reservation, itinerary management) fully integrated with the backend.

Integration with Accounting Systems and GDS

a) Enable integration with existing 3rd party accounting systems e.g. MYOB, ACCPAC, UBS etc. and GDS e.g. Abacus, TravelPort, Amadeus etc.

10.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.
b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.
c) Shortlisted Consortia must work in consultation with NATAS and relevant government agencies to refine project details.

11. Precision Engineering (PE) Manufacturing Industry (High Mix Low Volume Production Environment)

Precision Engineering (PE) industry is the backbone of the manufacturing sector, supporting many downstream products. The diversification of the industry has resulted in the growing complexity of managing its operations. As a result, many of these companies feel the need for a computerised production planning and shop floor tracking tool to assist them in managing customer demand on a dynamic basis in a complex and typically High Mix Low Volume (HMLV) manufacturing environment.

An automated production planning and shop floor tracking system for HMLV manufacturing environment to improve delivery performance, maximize the plant throughput and resource utilization, achieve efficient production tracking and clear shop floor visibility would provide the ability to react to deviations or unplanned events in production.

The scope of the solution for the PE companies shall include but not be limited to the following:

a) Improved machine utilization by reducing setup and machine conversion, therefore reducing the need to invest in extra manpower to handle excessive setup/conversion effort.
b) Improved shop floor visibility, no need to hire ‘expediters’ just to update the status of each work order manually.
c) Improved productivity by eliminating duplicated data entry, manual paper work and missing work order paper record.
d) Eliminate unproductive manual operations (e.g. Input/output recording between WorkCentre/machines, manual entry of sales order into Excel spread sheet, work order tracking by paper traveller, etc.).

11.1. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.

b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes, such as Enterprise Resource Planning (ERP) system.

c) Shortlisted Consortia must work in consultation with the relevant government agencies and associations to refine project details.

12. Precision Engineering (PE) Manufacturing Industry (Business Process Automation – Item track & trace)

Many Precision Engineering (PE) SMEs currently manage and track their items manually without using an automated or computerised system. Most businesses spend too much time doing the same manual processes repeatedly leading to inefficiency and error - this slows down the speed at which the PE companies operate and increases the cost of doing business.

The scope of the solution for the PE companies shall include but not be limited to the following:

12.1. Item track & trace System

a) Item (such as work piece, orders, asset etc) can be identified effectively by Auto-ID (such as RFID, barcode, QR).
b) Capture real-time information of item in a process through scanning Auto ID label.
c) Information and latest status of item can be available and retrieved anytime.
d) Provide information management for items.
e) Enable resource tracking (e.g. integration with ERP system, track inventory/consumables level at mobile sites).
f) Allow tracking and notification on items in critical status and progress.
g) Enable ground-staff to exchange information with main office on job done or job updates in real-time through mobility solutions (e.g. smartphones).
h) Generate reports automatically through web browser.
i) Enable staffs to monitor and retrieve information through web browser.
j) Application of the system can be WIP tracking, inventory tracking, asset tracking etc.

12.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.

b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.

c) Shortlisted Consortia must work in consultation with the relevant government agencies and associations to refine project details.

13. Hotel

Growth in the hotel sector has resulted in strong demand for manpower in areas such as Front Office Receptionist. This coupled with the tightening of labour market has led to increase in workload for the front office staff and lower customer service levels. To address these issues, the proposed self-service check-in/-out solution shall aim to (i) be complementary to existing processes; (ii) cut down on the demand for front office staff; and (iii) improve customer registration turn-around efficiency.

The scope of the solution for the hotels shall include but not be limited to the following:

13.1. Hotel self-service check-in/-out system

Guests' Particulars and Authentication Management

a) Allow the self registration process to capture the following necessary information from guests as set out under Chapter 127 Paragraph 27 of the Hotels Act. (e.g. through kiosks, terminals or mobile solutions)
   i. Full name
   ii. Particulars of any identity card, passport or other travel document issued to him
   iii. The place where he arrived and his address there
   iv. The probable duration of his stay and his intended destination
   v. His occupation and place of employment
   vi. His nationality
   vii. The hour and date of his arrival and departure

b) Allow the authentication of guests' particulars using a signature or right thumb print as set out under Chapter 127 Paragraph 28 of the Hotels Act (e.g. through writing pad, finger print reader, etc.).
c) Authenticate the identity of the guests against the identity documents used for registration.

d) Comply with the requirements set out in Chapter 201, Section 19, Paragraph 17 of the National Registration Regulations.

e) Comply with the requirements set out in Chapter 201, Section 19, Paragraph 17 of the National Registration Regulations.

   i. The guest(s) should be in possession of an identity card or valid passport or other travel document or official document of identity issued to him, that has been stamped by an immigration officer of Singapore to show that he is permitted to remain in Singapore for a restricted period; or

   ii. The guest(s) should be in possession of a diplomatic identity card, a consular identity card or an international organisation identity card has been issued by the Government; or

   iii. The guest(s) who is/are a member of any visiting armed force lawfully present in Singapore (excluding locally enlisted personnel) should be in possession of the official identity card or other document of identity ordinarily issued to members of such force.

f) Allow hotel staff to be alerted of suspicious guest(s) using counterfeit identification documents (either by the system, or in conjunction with other procedures such as human intervention procedures) immediately.

g) Allow hotel staff to be alerted of guest(s) who have exceeded their valid period of stay (where applicable) (either by the system, or in conjunction with other procedures such as human intervention procedures).

Room Access Management

a) For key / access card based - Enable the distribution and collection of room key/access card upon successful check-in.

b) For keyless based – Enable guest to gain entry to the room upon successful check-in e.g. through SMS of passcode, mobile keys, QR codes, etc.

Room Booking and Billing Management

a) Allow retrieval of room booking information.
b) Provide billing management to generate invoice/bill.

Payment Management

a) Enable multiple payment methods for guests (e.g. credit/debit cards, PayPal, mobile payment).

Movement Record Management

a) Enable recording of check-in/-out date and time of guests.
b) Enable the transaction performed to be logged and recorded, preferably in a video format, for retrieval.

13.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.
b) Provide the possibility of creating new/additional revenue lines by up-selling services and products on the self-service platform.
c) Shortlisted Consortia must work in consultation with Hotel Licensing Board (HLB), Singapore Tourism Board (STB), Singapore Police Force (SPF), Ministry of Home Affairs (MHA) and relevant associations to refine project details.
f) Shortlisted Consortia will be assessed by HLB/STB/SPF/MHA to ensure the proposed solutions meet the requirements stated in the specifications.
g) Upon implementation, should any additional changes be required due to changes in legislation or policy, awarded Consortia shall make the necessary changes within a reasonable time to keep up with requirements.

h) STB/IDA retain the right to withdraw approval for the use of the solution should the solution not meet the requirements stated in the specifications, or be unable to make the necessary changes within a reasonable time to keep up with changes in legislation or policy.

14. Chemical Industry

Chemicals are widely used in many industries and a large number of them are toxic, corrosive or flammable. For chemicals to be safely handled, information on their physical, chemical and hazardous properties along with the necessary safety precautions should be made readily available to users. The Globally Harmonised System of Classification and Labelling of Chemicals (GHS) is a United Nations (UN)-developed system for chemical classification and hazard communication through harmonized provisions for standardized labels and safety data sheets (SDS). Two key challenges faced by chemical manufacturers, suppliers and users are the authoring of the GHS-compliant SDS and the manual design process for labels. Solutions that assist in the authoring of the SDS, especially for mixtures, and automation of label designs would save valuable time and improve workplace safety for the chemical industry.

The scope of the solution for the chemical industry shall include but not be limited to the following:

14.1. SDS Platform and Label Design System

SDS Management and Creation

a) Allow for searching of chemicals in SDS database (e.g. name, composition, description).
b) Provide automatic authoring and editing of GHS-compliant SDS for both single substances and mixtures.
c) Enable user to upload SDS data for own mixtures to database.
d) Allow for the importing and exporting of SDS data (e.g. PDF, Microsoft Excel).
e) Provide multi-lingual data and interface for export purposes.

Label Design Management and Creation

a) Allow for the importing of SDS data.

b) Allow for automatic capture and formatting of the following requirements into different dimensions in accordance to the Singapore Standard SS 586 specification
   a. Chemical name (identifier)
   b. GHS pictogram(s)
   c. Signal Word(s)
   d. Hazard Statement(s)
   e. Precautionary statement(s)
   f. Supplier information
   g. Any other information

Integration

c) Enable integration with existing ERP, accounting and inventory systems, where applicable.

14.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.
b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.
c) Shortlisted Consortia must work in consultation with Singapore Chemical Industry Council (SCIC) and relevant government agencies to refine project details.

15. Attractions Industry

Finding an attraction that fits the travellers' profile and interest can be a challenging task. The user would also want to maximise his or her stay in Singapore by going to attractions located nearby to where he currently is. Coupons and discounts will also further serve to incentivise them to shop more in Singapore. One way to enhance a tourist's local experience would be to send personalised discounts and itinerary suggestions based on their locality and preferences. Such targeted and contextualised marketing platform would appeal strongly to the attraction owners looking to increase their visibility and drive ticket sales. At the same time, the tourist would only receive promotions that are relevant and which they are most likely to buy.

The scope of the solution for the tourist attractions shall include but not be limited to the following:

15.1. Tourist Attractions Management System (For attraction owners)

Content Management Module

a) To create and upload attraction's information with multimedia (text, pictures, videos etc.).

Promotion Management Module

a) To create new promotion campaigns with option to target specific groups of tourists based on predetermined preferences, profiles and nationalities.

Ticketing Sales and Booking Module

a) To create a ticketing inventory for sale of eTicket on the platform (eTicket may be based on GR code, NFC or any other applicable technology).
b) To manage the bookings and visitation schedules as per request by the tourists.

c) Track and monitor inventory level, notify owner when low in stock.

Date Analytics Module

a) To provide reports that can help attraction owners derive insights on the tourist behaviours e.g. demographics, purchase patterns, visitor routes etc.

Workforce Management Module

a) Provide integrated time management system comprising functions such as e-leave, payroll, time and attendance and shift scheduling with generation of labour costing reports.
b) Provide predictive analytics for manpower requirement based on data such as past trends, e-ticket sales, advanced bookings etc.

15.2. Tourist Attractions Management System (For tourist)

Account Creation Module

a) Allow tourist to enter profile and preferences (e.g. age, purpose of visit, child-friendly or adrenaline rides, length of stay, location of stay, etc.).

Travel Planning Module

a) Allow tourist to plan their itinerary for the trip e.g. things want to do, places want to visit, things to buy etc.

Attraction Booking Module

a) Allow various channel for booking (e.g. web booking, mobile booking).
b) Allow tourists to view and reschedule their bookings.

Offer/Itinerary Recommendation Module

a) Provide recommendations to relevant offers based on the tourist's profile and locality.
b) Suggest itinerary for the day based on the tourist's profile and locality.

Transport Booking Module

a) Allow the app to book taxi ride to the next place on the itinerary.

Payment Module

a) Provide multiple methods for payment (Paypal, COD etc.).

Feedback Module

a) Allow tourist to give feedback on the attraction after visiting
b) Enable tourist to share their experiences (text, photos, video etc.) via social media and other websites.

15.3. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.
b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.
c) Shortlisted Consortia must work in consultation with the Association of Singapore Attractions (ASA) and relevant government agencies to refine project details.

16. Waste Collection Sector

In Singapore, the waste management industry has been trying to cope with the challenges of having to manage increasing amounts of waste, due to economic and population growth, while facing difficulties with staff recruitment. Some key challenges identified by the industry include optimising the waste collection process and standardising the reporting of solid waste and recyclables to relevant stakeholders including customers, government agencies and managers of the companies.

Hence, an IT system proposed can integrate 3 key areas that are required by the waste management industry. The first area is optimisation of collection services such as vehicle routing, manpower job scheduling, weighbridge measurement and equipment tracking. The second is waste and recycling data capturing and reporting interface. The third is business systems such as Customer Relationship Management (CRM), hotline, finance/accounting and warehouse management.

The scope of the CFC solutions required by the waste management companies shall include, but not be limited to the following:

16.1. Optimisation of Collection Services

a) Provide job planning and optimisation to schedule manpower and resources, analyse and highlight job dependencies (driver/crew management). Enable ground staff to exchange real-time information with main office on collection updates through mobility solutions.
b) Fleet management services (maintenance and service programs, reports, renewal of road tax, insurance, etc.). Provide scheduling on mandatory equipment maintenance and compliance check deadlines (e.g. hook lift or bin inspection).
c) Enable resource tracking (e.g. integration with fleet management system, with truck capacity and resource requirements). Location base management of waste collection fleet and provide real-time re-routing.

16.2. Waste and Recycling Data Capture

a) Integration of sorting and weighing systems for waste reporting
b) Enable intelligent bin management for trucks to optimise trip of each collection and measure weight of wastes/recyclables (e.g. with RFID).
c) Generate reports automatically for submission to service buyers upon completion within the same working day. Generate waste management data and improvement plans based on NEA's template.
d) Provide management dashboard view of operational statistics and trend analysis.

16.3. Business Operations

a) CRM systems to track customer feedback and requests. To manage hotline and information flow between public and service providers.
b) Finance and accounting. Manage quotations, job orders, billing and pricing rates. To comply with IRAS standards and requirements.
c) HR management. Driver and crew attendance, payroll and remuneration tied to jobs completed.

16.4. Additional Requirements

a) Shortlisted Consortia must work in consultation with National Environment Agency (NEA) and the relevant associations such as the Waste Management and Recycling Association of Singapore (WMRAS) to refine project details.
b) Waste management companies may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.

17. Retail (Department Stores and Concessionaires)

Retail department stores in Singapore generate a large proportion of their revenue through concessionaires. Most of these concessionaires sell their wares at different retail department stores and thus make multiple delivery trips per day to each of the store for stock replenishment. Such delivery trips, at unscheduled timeslots and potentially at less than full truck capacity, have led to problems of congestion at the loading and unloading bays of malls. An identified opportunity in the sector would be a shared logistics network amongst key concessionaires and major department stores that would enable the aggregation of deliveries from different concessionaires to the same department stores.

The scope of the solution for the shared logistic network shall include but not be limited to the following:

17.1. Shared Logistics Network Solution for Retail Department Stores and concessionaires

Scheduling Module

a) Ability for concessionaires to schedule ad-hoc or recurring stock replenishment needs for each store with inputs such as volume of goods per store, types of goods, period of day for delivery.
b) Ability to counter-propose cost-efficient delivery schedules of goods from concessionaires to key department stores, based on possible factors such as aggregation of demand per store and types of goods to be delivered.

Route and Capacity Planning Module

a) Ability to manage truck assignments and capacities, based on volume and size of goods to be delivered, to ensure optimum usage of limited truck space per delivery trip.
b) Ability to suggest best delivery route for deliveries across major department stores, taking into account possible factors such as

distance, traffic conditions, and volume and types of goods to be delivered.

c) Ability for addition of new trucks and retail department stores outlets.

Integration to Existing Systems

a) Integration and auto update of received and delivered goods in existing Inventory Management and POS systems of department stores and concessionaires.

17.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.

b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.

c) Shortlisted Consortia must work in consultation with major department stores, concessionaires and the relevant associations to refine project details.

18. Traditional Chinese Medicine (TCM)

In the Traditional Chinese Medicine (TCM) Industry, the process of tracking the inventory, prescription and dispensing of herbs is often manual and complex. Key identified areas to be addressed include the ability to assist the TCM physicians to better manage their inventory level and procurement process, as well as keeping records of prescriptions to patients for subsequent follow up.

The scope of the solution for the TCM sector shall include but not be limited to the following modules and functions:

18.1. Integrated Clinic Management System

Appointment Booking Module

a) Allow various channel for self scheduling and management of appointments by patients (e.g. web booking, mobile booking).
b) Enable scheduling function for management of appointments.
c) Enable reminder functions for appointments.

Diagnosis and Prescription Module

a) Allow easy entry of diagnosis and prescription by physicians for each patient.
b) Provide database of modern techniques and associated prescriptions for common diagnosis to enable physicians to improve their clinical results.
c) Enable the prescription to be linked to herb / medication dispensing department for straight through process.

Patient Records and Management Module

a) Ability to capture patients' medical records such as previous diagnosis, drugs history and allergies.
b) Enable reminder feature to patients for follow up diagnosis.
c) Enable remote aftercare services through providing online channels for patients to enquire on medicine dosage and symptoms.

Payment Module

a) Enable auto-calculation of cost based on prescription.
b) Enable auto-generation of invoice/bill and support multiple payment modes such as cash and cards.
c) Enable integration with commonly used accounting software.

Inventory and e-Procurement Module

a) Allow stock shortage query function e.g. system will auto-calculate drug ordering amount according to the average amount used in prescriptions.
b) Enable online order form generation for procurement of herbs / medications.
c) Enable notifications function to supplier for each order.
d) Enable online review or search of Purchase Order status on supplier side, query order history and statistic reports for clinic.
e) Allow online Delivery Order verification and confirmation of drug delivery items and quantity with auto-update of drug inventory amount.

Supplier Module

a) Allow online Purchase Order retrieval with ability to export to commonly used format such as excel.
b) Enable online Delivery Order generation with information such as drug quantity, drug batch number and drug expiry dates.
c) Allow online Delivery Order submission to clinics by suppliers.
d) Provide order history and generate statistics reports for supplier.

e-Learning Management Module

a) Enable remote and self-learning through distance learning with local and overseas institutions.
b) Enable to upload learning materials and links for TCM physicians to upgrade knowledge of drug usage and prescriptions.

c) Allow to set up forum or community to encourage sharing and discussion.

d) Allow assessment functions to examine user's proficiency of the drug usage and prescriptions.

18.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.

b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.

c) Shortlisted Consortia must work in consultation with institute of Chinese Medical Studies (ICMS) and the relevant associations to refine project details.

19. Manufacturing Sector (Energy Efficiency)

Companies are constantly faced with high-energy consumption and increasing energy cost. This is especially acute in the manufacturing industry where energy cost is significant compared to the overall operational cost. To address such concerns, companies could step up in their energy monitoring and optimising efforts to assist in energy wastage reduction and increased competitiveness.

The scope of the solution for the manufacturing companies shall include but not be limited to the following:

19.1. Energy Monitoring System (EMS)

a) Provide automated energy usage data collection of the operations.
b) Provide analytics on energy usage data and provide a means of identifying areas for improvement.
c) Provide alerts on unusual energy peaks, which require attention by the operations to identify errors or maintenance requirements.
d) Provide reminders on maintenance checks to improve energy usage efficiency.
e) Generate reports automatically for submission to relevant government agencies for accreditation requirements.
f) Enable benchmarking of energy usage across similar sectors for reference.

19.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.
b) Metering and sensing devices should comply with common industry standards (e.g. Zigbee, Modbus, etc).
c) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.

d) Shortlisted Consortia must work in consultation with relevant government agencies and associations to refine project details.

20. General Cleaning Sector

The cleaning industry is large and diverse with companies providing various cleaning services, including general cleaning of commercial, food and beverage and conservancy areas. With tightening foreign manpower, an ageing cleaning workforce and persistent challenge in attracting locals into the industry, there is an increasing need to raise productivity of the workforce and improve the efficiency of work processes of the cleaning industry. Many cleaning companies are not equipped with ICT solutions with strong operational and analytical capabilities that can improve operational efficiency and human resource management capabilities.

The scope of the solution required by the cleaning companies shall include but not be limited to the following:

20.1. Cleaning Management System

a) Fleet Management Module - Enable optimisation of vehicle deployment, routing, tracking and reporting.
b) Workforce Management Module – Enable on-site reporting and tracking of workforce deployment, tracking of work tasks and reporting job completion.
c) Work Management and Reporting Module - Enable efficient contract management which tracks contract requirements, including manpower deployment, work scheduling, mobile work reporting interface (Smart Mobile Device App), performance auditing to ensure that cleaning works comply with the contract requirements and enable easy and prompt reporting to service buyers.
d) Customer Management Module - Enable tracking of customers at various premises, customer satisfaction and reporting of feedback to estate management, service providers/buyers via Smart Mobile device App, tablet platform, etc.

e) Business Intelligence and Analytics - Enable analysis of data for easy generation of report for various aspects of operations e.g. manpower deployment and attendance, work performance per site, inventory of equipment/machines at work sites, cleanliness and performance outcomes, generate trends to determine human traffic flow / usage at different premises, performance audit, etc.

f) Litter level sensor in litter bins and reporting system - Enable monitoring of litter in litter bins and to alert the cleaner at site / area as well as supervisor via a central system, when the litter bins are full and need to be cleared.

g) Other general business Operation Management Modules - Provide accounting & finance, business intelligence, human resource functions such as processing payroll, tracking training records, staff appraisal forms, employment contracts, etc.

20.2. Additional Requirements

a) Where feasible, all modules shall have open interface specifications to enable integration with existing systems and allow for future capabilities expansion.

b) Consortia may use their own discretion to consider other optional software or modules to further enhance operational productivity and streamline processes.

c) Shortlisted Consortia must work in consultation with National Environment Agency (NEA) and the relevant associations to refine project details.