Terms of Reference (TOR)

For

PPP EAS Digital Transformation Process——
QR Warehouse Management Solution
PPP 东亚糖业流程数字化职权范围——
二维码仓库管理方案

Table of Contents 目录

1. Executive Summary 执行概要

Guangxi Nanning East Asia Sugar Group has planned to implement a business digital transformation project aimed at leverage business operations. The project will use an innovative technology to build the capacity of operations. The system will provide a platform to easily digitize data leading to business standardize within East Asia Sugar Group. 广西南宁东亚糖业集团计划实施业务数字化转型项目以优化业务操作，采用创新技术实现业务能力的提升。该系统将为数据的数字化提供平台，促进集团内部业务操作的统一和标准化。

2. Background 背景

Guangxi Nanning East Asia Sugar Group (hereinafter referred to as EAS) is invested by Mitr Phol Group of Thailand since its entering Chongzuo city of Guangxi in 1993. Now East Asia Sugar Group has 10 companies: 6 sugar mills with the cane milling capacity of 92,000 tons/day and sugar output of approximately 1 million tons per year, which crushed 8.74 million tons of cane and produced 1,040,000 tons of sugar in total in crop 2017/18, ranking the third place in China and the first place in Guangxi; 3 biomass electric power plants with the generating capacity of 390 million kwh per year; and 1 BB fertilizer plant with the capacity of 100,000 tons per year. The above 10 companies are accounted independently. At present, more than 3,500 employees work with and; over 350,000 cane growers build good relationship with the Group. The Group can realize sales revenue of approximately RMB8 billion yuan and tax payment of about RMB500 million yuan per year. 广西南宁东亚糖业集团（以下简称东亚糖业），由泰国两仪集团于 1993 年进入广西崇左市成立，现有 10 家公司：6 家糖厂，日处理甘蔗能力 9.2 万吨/天，年产糖量 100 万吨左右。2017/18 年榨季集团甘蔗压榨量 874 万吨，产糖量 104 万吨，居全国第三、广西第一；3 家 30MW 生物质能源发电厂,年发电能力约 3.9 亿度；1 家掺混肥料厂，年产肥料 10 万吨。集团 10 家公司独立核算。集团现有员工 3500 多人，与集团有密切联系的蔗农超过 35 万人。年销售额约 80 亿元，年度纳税总额 5 亿元左右。

Currently, business operation is mainly operated in both manually and also in the ERP SAP system. As a model, East Asia Sugar co., Ltd. would like to leverage the business process in area of PPP (Plants, Purchase, Pay) with process digitally and able to get advantage from digital theme. We are using SAP EHP8 ERP system and Weawer OA system. 鉴于目前各项业务仍以人工手动和 ERP SAP 系统操作作为主，集团拟在工厂、采购、财务付款（PPP）三个业务系统先行实施数字化业务流程优化，并从中总结出业务流程数字化的优势，以此作为范例。我们正在使用的是 SAP EHP8 ERP 系统和泛微 OA 系统。

The proposed digital platform will mostly be utilized at first or second level operations in EAS. The development of technologies supporting this project, require tools and components that are user friendly, easy to sustain and possibly be replicated in various other facilities and settings in the future. The developer should interpret and prescribe suitable solutions,

considering current industry standards, ease of use and maintenance, as well as sustained future outlook. 上述数字化平台将主要用于集团的一、二级业务。基于项目的技术研发要求相关工具和组件应以方便用户为主要考量，且易于将来维护和在其它设备、设置中进行复制。在制定相应方案时，开发人员应将现行行业标准、系统操作和维护是否简便纳入考虑，并具有一定的前瞻性。

3. Objective of the project 项目目的

- To create a platform that will assist EAS to address the challenge of digital business transformation through improve operation and data management at the required level. 通过平台的创建，优化操作和管理数据，帮助东亚糖业应对数字业务转型的挑战。
- Digitalize data with the aid of a coding system that is aligned to business requirements. 借助基于业务需求的编码系统对数据进行数字化处理。
- Alignment of system to digital tools such as mobile, QR code, workflow etc. through innovative mechanisms. 通过创新机制，使系统与手机、二维码、工作流等数字工具保持一致。

4. Scope of work and key deliverables 工作范围和关键交付成果

This assignment is to design, develop and deploy a customized programs. The detailed scopes of work are specified in Annexure I. 项目主要任务是定制程序的设计、开发和实施。具体工作范围详见附件一。

5. Implementation Methodology and Deliverables 实施方案和交付成果

The details explanation of methodology that is instructional steps or guidelines to manage the project to ensure project are working well and also completed on time. The method is use to achieve the objective of the project that will accomplish a perfect result. And also define the key check point with key deliverables to evaluate the status of the project. 实施方案是项目实施的指导方针，用于项目管理，以确保项目的顺利开展和按时完成。该方案对如何达成项目目标和理想效果、如何确定关键检查点和关键可交付成果以评估项目进度予以指导。

Project meeting and minute of meeting need to be defined regularly. 定期召开项目会议并形成会议纪要。

6. Project Organization Structure with Role and Responsibility 项目组织结构（角色和职责）

Project organization need to be described to ensure that there are enough team members and provide a team of experts with the approved skill sets who shall be adequately qualified and experienced in both development projects and IT related field to satisfactorily and timely deliver the expected outputs. 项目组织架构的制定是为了确保有足够的团队成员，并配备一个在项目开发和 IT 相关领域都具备足够资质和经验的专家团队，以圆满和及时地交付预期成果。

Profile of team members with their roles and responsibilities are also described in details.同时详细描述了团队成员及其角色和职责。

7. Project Timing 项目时间

The project time frame need to be defined with list of deliverables as per explain in the detailed project methodology and deliverables. 根据项目实施方案和交付成果中列出的交付成果清单制定项目时间表。

8. Ownership and Copyright 所有权和版权

The developer is required to hand over the final product by 31.12.2019. 开发者必须在 2019 年 12 月 31 日前交付最终产品。

The final product is developed and customized for EAS. All source codes and technical documents shall be accessible by customers, convenient for maintenance, and the copyright rights shall be shared by both parties. 最终产品针对 EAS 定制开发，须开放所有源代码、技术文档给客户以供维护，版权双方共有。

9. Warranty 质保

Provide three-month online support after the implementation of the system, and then one-year warranty period after the end of the three-month online support. During this period, the developer is responsible for the following technical support 项目上线后提供 3 个月的上线支持，上线支持结束后，再提供一年质保。在此期间，开发人员应提供以下技术支持:

- Update patches 更新补丁
- Fix bugs 修复错误

- Make post-deployment changes to the system based on feedback from user experience 根据用户体验反馈，对系统进行部署后更改。

10. Scope of price proposal 价格

Vendors have to submit their technical and financial (price offers) as separate components of one application as follows 供应商应提交技术和财务（报价）方案，作为投标文件的组成部分，包括：

- Comprehensive CV 综合介绍
- Technical proposal 技术方案
- Financial proposal 财务方案

The offer should be all inclusive (Lump Sum Amount), with all costs (professional fees, travel costs, living allowances, communications, consumables, etc.) that could possibly be incurred by the consultant should already factored into the final amounts submitted in the proposal 报价应为包干价（包干总价），包含指派顾问在项目工作期间可能产生的所有费用（专业费用、差旅费、生活补助、通讯、消费品等）。

The contract price is fixed regardless of changes in the cost components. 即使费用细分项目调整，合同总价固定不变。

Applications must be clearly marked "MP & EAS PPP Project"申请时候需要注明"MP & EAS PPP 项目"

11. Annexure I – Detailed scope of the project 附件 1- 具体项目范围

The details of the scope includes following 具体项目范围包括：

11.1 System Requirement Specification 系统需求规范

11.1.1 Database 数据库

Using SQL SERVER database in EAS.东亚采用 SQL SERVER 数据库。

The system must encrypt personal data, usernames and password stored in the database using Advanced Encryption Standards (AES). 系统必须采用高级加密标准（AES）对储存于数据库中的个人资料、用户名称及密码进行加密。

11.1.2 Application 应用

All request and data transfer between the server and the database must be done over an SSL connection. 服务器和数据库之间的所有请求和数据传输都必须通过 SSL 连接完成。

The application shall have tutorial documentation, for the purpose of educating new users as well as acting as a reference. Clear procedures and proper protocol must be explained in detail, as often these tasks must respect both legal and business concerns. These procedures shall be presented in step by step instructions which are accompanied by both screenshots and application tooltips. The goal here is to produce an interface which can self-teach its own practice to any first time users. 应用文件应包含教程，以便对新用户进行指导并作为参考资料。必须有清楚流程和适当协议（计算机术语）的详细解释，通常应该既遵循相关法规又能符合相关业务需求，通过操作程序的逐步说明，并附带截图和应用程序工具提示，以方便首次使用的用户独立学习和操作。

11.1.3 Communication 通信

All communication between the server, session app and system application will be done over SSL. 服务器、会话应用程序和系统应用程序之间的所有通信都将通过 SSL 完成。

The database will communicate via an encrypted remote connection using SSL. 数据库将使用 SSL 通过加密的远程连接进行通信。

11.1.4 Interoperability 互操作性

System should support 系统需支持:

- Data transfer and sharing on much more than a local or enterprise-wide scale 远超本地或企业范围的数据传输和共享
- Knowledge transfer and integration 知识转移与整合
- Image transfer 图像传输
- Integration with SAP and non-SAP applications 与 SAP 和非 SAP 应用程序集成

11.1.5 System error correction 系统误差修正

The system must require high levels of error correction and input validation. 系统要求高水准的误差校正和输入验证。

11.1.6 Others 其它

All electronic approval processes shall be based on the organizational structure consistent with the one for OA system (synchronize with HR). 所有的电子审批流程，使用和 OA 系统一致的组织机构（同步 HR）。

11.2 Modules 模块

The major features include, but not limited in each digital transformation process. 主要功能包括但不限于各项数字化转型流程。

Able to work flexible in the digital tools; QR code, Web-based both computers and mobiles/tablets, Mobile responsive, Work flow etc. 能够灵活地使用数字化工具：二维码、网络计算机和手机/平板电脑、移动端响应、工作流程等。

The development of QR code warehouse management system implementations requires at least the following characteristics 开发二维码仓库管理系统实现至少要有以下特征：

11.2.1 Receiving and dispatching goods in Nanning transit warehouse 南宁中转仓收发货

1. Warehouse management system and purchasing coordination platform. After receiving the materials, Nanning transit warehouse scans the two-dimensional code on the delivery list and confirms receipt of the materials. The system will feed back the information of " the goods have arrived in Nanning transit warehouse" to the purchasing coordination platform for the suppliers, purchasing department and purchasing department to inquire. Meanwhile, SMS / WeChat will be sent to the suppliers and purchasing department.

仓库管理系统与采购协同平台。南宁中转仓收到物资后扫描发货清单上的二维码，点确认收到物资，系统将"货已到南宁中转仓"的信息反馈至采购协同平台以便供应商、采购部和请购部门查询，同时短信/微信发送给供应商和请购部门。

2、The factory sends a car to Nanning transfer warehouse to pick up the goods, the warehouse keeper scans the QR code on the list to load the goods, and the system feeds back the information of " the goods have been loaded and transported back to the factory" to the purchasing coordination platform for the suppliers, purchasing department and purchasing department to inquire, and at the same time, SMS / WeChat is sent to the suppliers and purchasing department.

工厂派车到南宁中转仓提货，仓管员扫描清单上的二维码装货，完成物品装车。系统将"货已装车运回工厂"的信息反馈至采购协同平台以便供应商、采购部和请购部门查询，同时短信/微信发送给供应商和请购部门。

11.2.2 Inventory in factory warehouse 工厂仓库收货

Warehouse management system interfaces with SAP system and purchasing platform, can be obtained from SAP real-time need to put in storage order information. Receipt quantity cannot be greater than order quantity. The system automatically updates the SAP inventory quantity under the condition of network coverage after receiving the goods（The PDA can temporarily store data

in the PDA in the area without a network, and automatically upload the data to the system when there is a network）.After receiving the goods, upload the " received" information to the purchasing platform and feed it back to the requisitioning department and suppliers.

After receiving the goods, the hardware and materials department of the factory opens the receiving interface with PDA. Scan QR of arrival list on goods（The QR code contains the following information: order number/requisition number/material code/name/model/quantity/consignment company/requisition department and contact information/supplier name/number/shipper/date/contact number. ）Check the actual arrival value on the delivery list, confirm the arrival quantity（If the arrival quantity is consistent with the order, check it. If the arrival quantity is inconsistent with the order, fill in the actual arrival quantity manually）, The system automatically pops up the warehouse location and shelf location where the goods should be stored, and after the staff confirms the warehouse location and shelf location, the two-dimensional code of the delivered goods is generated. One Line Material One The QR code. The material The QR code contains the following information: order number/material code/name/model/quantity/consignment company/requisition department and contact information Location / shelf location /supplier name/number/shipper/date/contact telephone number. Print The QR codes and paste them on items

仓库管理系统与 SAP 系统和采购平台对接，可从 SAP 实时获取需要入库的订单信息。收货数量不能大于订单数量，系统收货完成后在网络覆盖情况下自动更新 SAP 库存数量（PDA 在没有网络区域可以暂存数据在 PDA，有网络时在自动上传到系统）。完成收货动作后将"已收货"信息上传至采购平台、反馈给请购部门和供应商。

工厂五金材料科收到货物后用 PDA 打开收货界面，扫描货物上到货清单的二维码（二维码包含以下信息:订单号/请购单号/物料编码/名称/型号/数量/收货公司/请购部门及联系方式/供应商名称/编号/发货人/日期/联系电话），勾选送货清单上实际到货物资，确认到货数量（到货数量和订单一致勾选即可，到货数量与订单不一致则手动填写实际到货数量），系统自动弹出该物资应存放的库位和货架位置，工作员确认库位和货架位置后生成到货物资二维码，一行物资一个二维码（物资二维码包含以下信息:订单号/物料编码/名称/型号/数量/收货公司/请购部门及联系方式/库位/货架位置/供应商名称/编号/发货人/日期/联系电话），打印二维码粘贴到物品上。

11.2.3Articles on shelves 物品上架

According to the shelf position recommended by the system, the staff will place the items on the designated location. The system will update the location inventory and update the SAP inventory in real time under the condition of network coverage.

Each shelf is printed with a The QR code (The QR code contains the following information: material code/name/model).Scanning theQR code on the qualified items, showing the storage area and shelf of the items Put the material on the corresponding shelf, and scan theQR code on the shelf to confirm whether the material is stored correctly; when it is incorrect, adjust the material to the correct storage location, and automatically update the shelf information.

工作员根据系统推荐的货架位置将物品放到指定的货位上，系统更新货位库存，并在网络覆盖情况下实时更新 SAP 库存。

每个货架位置都贴有指定存放物资的二维码（（二维码包含以下信息:物料编码/名称/型号）。扫描验收合格物品上的二维码，显示物品应存放区域及货架。把物资放到对应的货架上，并扫描货架上的二维码确认物资存放是否正确；不正确时将物资调整到正确存放位置，并自动更新货架库存物资的信息。
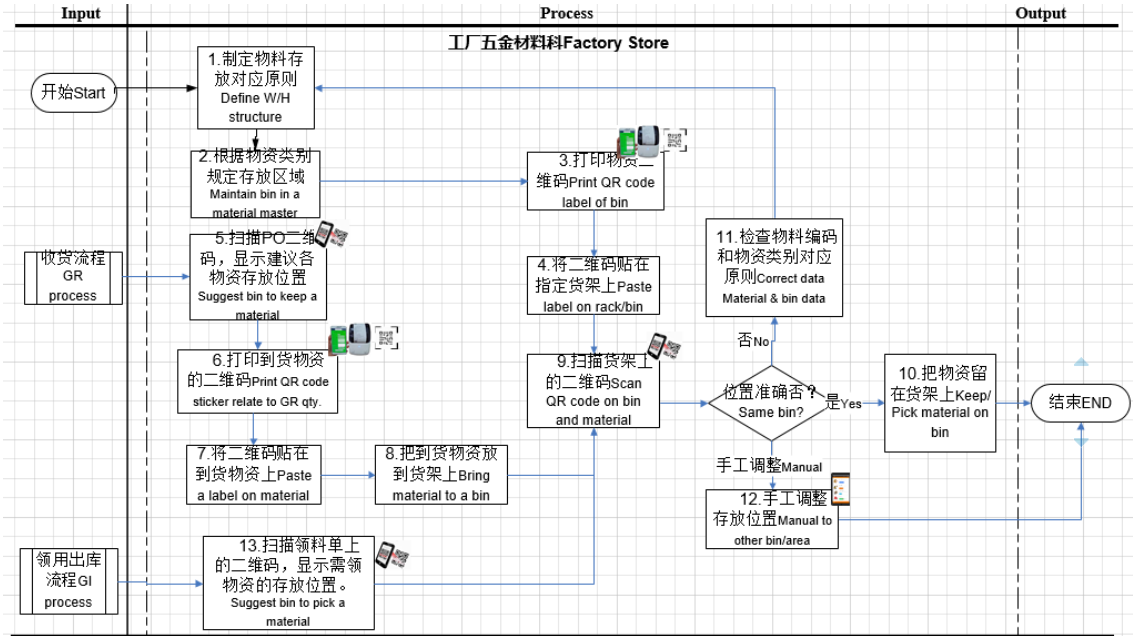

Figure 1: Inventory management process 库存管理流程

11.2.4 Internal Acquisition and Deposit 内部领用出库

Warehouse management system interfaces with SAP system and purchasing platform. Inventory items can be combined and queried according to their characteristics (equipment name, model, workshop section, etc.).

Picking personnel fill in the electronic picking list on the procurement platform, and generate the two-dimensional code of the electronic picking list after being approved by the authorized personnel(name/model/quantity, requisition department, deducted budget cost center/commitment/maintenance work order number, etc.) After completing the examination and approval, the picking list will be transferred to the hardware and materials department. meanwhile, the system will occupy the inventory according to the information of the picking list. the occupied inventory cannot be collected by other sections. The staff will take the materials to be collected from the shelves, scan the two-dimensional code of the outbound items, save the information of the outbound items (quantity, name, model, etc.) and the information of the collecting department for confirmation, and automatically change its inventory status (deduct inventory). After the operation is completed, the warehouse management system will upload the data to SAP in real time with network coverage, and SAP will deduct the inventory to realize synchronization with the warehouse management system.

Auction of overstocked goods is to make a stock of goods (deducting stock) through sales orders.

仓库管理系统与 SAP 系统、采购平台对接。库存物品可以根据物品的特征进行组合查询（设备名称、型号、工段等）。

领料人员在采购平台填写电子领料单，通过权限人员审批后生成电子领料单二维码（名称/型号/数量、请购部门、扣减的预算成本中心/承诺项/维修工单号等）。完成审批后的领料单流转至五金材料科，同时系统按照领料单的信息进行占用库存，被占用的库存无法被其它工段领用。仓库管理员通过扫描电子领料单二维码可以显示物品的存放位置信息，便于快速找到物品。仓库保管员将工段需领的物资从货架上拿出来，扫描出库物品二维码，对出库物品的信息（数量、名称、型号等）和领用部门信息进行确认信息保存，同时自动更改其库存状态（扣减库存）。操作完毕后，在有网络覆盖下仓库管理系统会将数据实时上传至 SAP，SAP 扣减库存，实现与仓库管理系统同步。
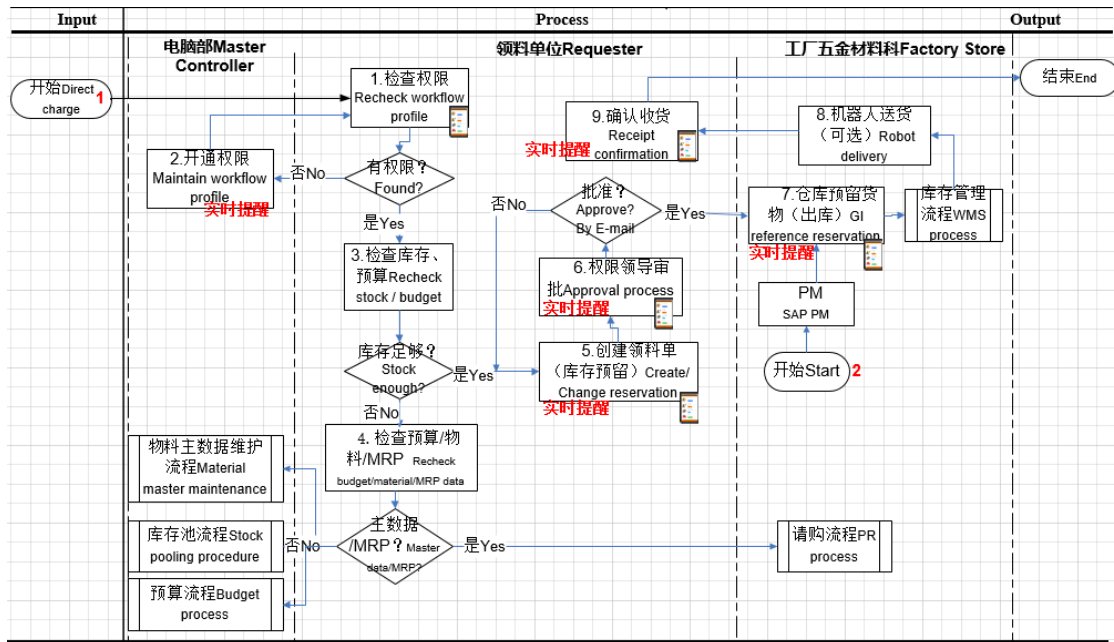
积压物资的拍卖是通过销售订单对库存物资做出库（扣减库存）。

Figure 2: Internal material acquisition process 内部领料流程：

11.2.5 Warehouse internal management 仓库内部管理

1. Shift management 移位管理

In the warehousing phase, the wrong warehouse location / shelf location can be used to transfer the inventory materials to the correct warehouse location / shelf location through the shift function.

入库环节入错库位/货架位置，可以通过移位功能将库存物资转到正确的库位/货架位置。

2. Area management& Visual control 区域化管理&可视化管理

According to the category of goods and materials, divide the area to manage the stock of goods and materials, the same type of goods and materials are stored in the same designated shelf position, and the stock of goods and materials can be easily identified. Two - dimensional codes of the materials are pasted in front of each type of materials, and scanning codes can display the inventory, warehousing and outbound records of the materials. Safety stock is identified by color, and stock quantity can be quickly identified on site.

根据物资类别划分区域管理库存物资，相同型号的物资存放在同一个指定货架位置，各物资摆放便于识别库存量；每个型号物资前面粘贴该物资的二维码，扫码可显示该型号物资的库存量、入库和出库记录。通过颜色标识安全库存，现场快速识别库存数量。

3. Inventory 盘点

According to the counting requirements, add the location to be counted to the counting plan, and the system will generate counting tasks. Inventory must exist for the location to be counted. The stocktaking personnel hold the wireless terminal to carry out physical inventory one by one according to the goods location and materials prompted by the system, and fill the physical inventory quantity into the handheld terminal. The inventory record of each goods location will be updated in real time with the operations of the stocktaking personnel. Inventory information cannot be modified after confirmation and submission.

The inventory leader inquires about the tasks completed by the inventory, derives the different inventory results, and submits them to the inventory personnel for restocking. After confirming the quantity of duplicate plates, the inventory leader confirms the inventory results, thus forming an inventory report. According to the final adjustment result, the system automatically makes inventory gain and loss and adjusts the actual inventory quantity.

根据盘点要求，将需要盘点的库位添加到盘点计划中，系统将产生盘点任务。需要盘点的货位必须存在库存。盘点人员手持无线终端根据系统提示的货位和物资逐一进行实物盘点，将库存实物数量填入手持终端，每次货位的盘点记录会随着盘点人员的作业实时更新。盘点信息确认提交后不可修改。

盘点组长查询盘点结束的任务，导出有差异的盘点结果，交由盘点人员进行复盘。盘点组长确认复盘数量后，确认盘点结果，从而形成盘点报告。系统根据最终调整结果自动进行盘盈盘亏，调整库存实际数量。
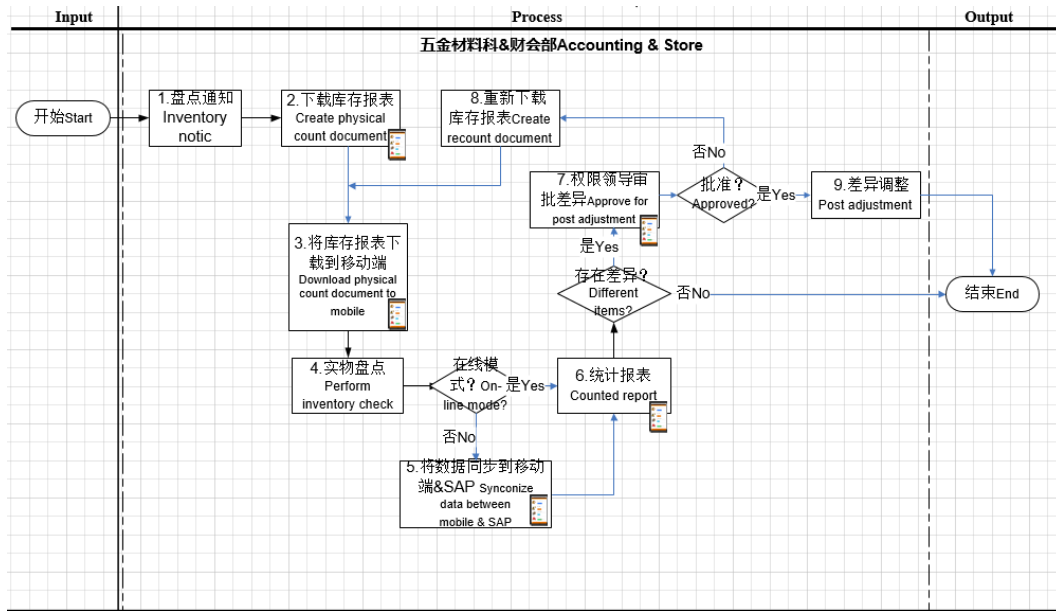
Input   Process   Output

五金材料科&财会部Accounting & Store

开始Start → 1.盘点通知 Inventory notic → 2.下载库存报表 Create physical count document → 8.重新下载库存报表Create recount document

7.权限领导审批差异 Approve for post adjustment → 批准？Approved？ 否No → 9.差异调整 Post adjustment

是Yes → 批准？Approved？ 是Yes

3.将库存报表下载到移动端 Download physical count document to mobile

存在差异? Different items? 否No → 结束End

是Yes

4.实物盘点 Perform inventory check → 在线模式? On-line mode? 是Yes → 6.统计报表 Counted report

否No

5.将数据同步到移动端&SAP Synconize data between mobile & SAP

Figure 3: Warehouse inventory process 仓库盘点流程:

11.2.6 Reporting requirements 报表需求

The warehouse management system can generate an inventory material report and a receipt / issue / storage report. The inventory material report displays information such as material code, material name, quantity, unit, amount, location, factory name, batch, requisition department, stock age, etc. The receipt / issue report can be used to export the receipt / issue information (material code, material name, receipt / issue quantity, unit, amount, factory name, batch, requisition / receiving department) of various materials during the period by filtering the time period.

仓库管理系统能生成库存物资报表、收发存报表，库存物资报表显示的内容包括：物料编码、物资名称、数量、单位、金额、库位、工厂名称、批次、请购部门、库龄等信息。收发存报表可通过筛选时间段导出该期间内各类物资入库、出库信息（物料编码、物资名称、入库/出库数量、单位、金额、工厂名称、批次、请购/领用部门）。

11.2.7 Reverse operation 反向操作

Reverse or reverse operation functions of all business operations shall be provided.

需提供所有业务操作的反向或者冲销操作功能。

11.3 General system requirements 系统通用要求

11.3.1 Technology Transfer 技术转移

The developer needs to engage with the EAS's project team during the project period, this is to harness transfer of technology as minor corrections and support will be done in house. However the developer must note that the EAS team have limited IT knowledge.

项目期间，开发人员应与东亚糖业项目团队合作，通过技术转移使其能够自行对微小错误予以校正，相应的技术支持公司内部即可提供。但开发人员也应注意到东亚糖业团队的 IT 知识有限。

11.3.2 Deployment of the system 系统部署

The developer is required to come up with a schedule of activities highlighting; milestones and expected deliverables such as; signing of contract, collecting user requirements, the different phases of system development, deployment and roll out etc. 开发者应制定具体行动计划，包括重大事项和预期交付成果，例如：合同签订、收集用户需求、各阶段的系统开发、部署、上线等。

The developer should also support user in terms of stabilization and making the system acceptable by the end users. 开发人员还应在稳定性、促使终端用户认可和接受该系统等方面提供支持。

11.3.3 Training 培训

The developer is required to provide training to the end users how to operate, management and administration of the system. This is also to provide an understanding of the system, its database and infrastructure configurations used during the implementation of the system. 开发者应为终端用户提供系统操作和管理等相关培训，加强对该系统及其数据库、以及所需基础设施配置的了解。

11.3.4 Documentation 文件

Content business design document including data model, user manuals (including screenshots) and any other documentation of the assignment have to be completed and handed over to the user. 须完成业务设计文档，包括数据模型、用户手册（包括屏幕截图）和其它相关文档，并移交给用户。

11.3.5 Technical Support 技术支持

The developer shall render all support activities related to the following up until the warranty period expires 质保期到期之前，开发人员还应提供后续支持：

- Troubleshooting at both application level and user level 应用程序故障的排除、用户问题的解决
- Assist focal official/client in operation of the portal 协助关键人员/客户熟悉门户网站的操作
- Fixation of bugs, incorporation of minor changes, etc. 错误修正、微调整合等。