STAFFORDSHIRE UNIVERSITY

A·P·I·I·T ASIA PACIFIC INSTITUTE OF INFORMATION TECHNOLOGY

ASSIGNMENT

LEVEL 5

DATABASE AND DATA STRUCTURES1
COMP50004

IF2321COM

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CONTENT

1. Business Case Document

Project Name: Automation of manual business process
Date:10/6/2023

Purpose:

This business case's objective is to explain why RR Clothing Store has to automate its current manual business process in order to increase operational effectiveness, boost customer happiness, and acquire a competitive edge in the market. This paper gives a high-level description of the project, its goals, anticipated advantages, and the needs.

Introduction:

Leading clothes retailer RR clothes Store has a branch abroad. The firm now uses manual processes for managing customers and executing orders. These operations must be automated, and IT must be used wisely, if businesses are to stay ahead of the competition, increase productivity, and improve customer experience.

Main objective of this project:

- Process orders more quickly and accurately by streamlining the process.
- To personalize services and raise client satisfaction, strengthen customer management capabilities.

In Scope:

- Analysis of current manual management process.
- Developing an automated system for order processing and customer management.
- Integration for seamless data interchange with current systems, including CRM and ERP.
- Generation of reports and analytics for decision making.

Out of scope:

- Employee management.
- Supplier management.
- Stock management.
- Promotion management.
- Accounting and payroll management.

Assumptions:

- One foreign branch.
- Starting the process where the products are already ready, therefore inventory management is neglected.
- Organization will allocate resources for training employees on the new system.
- Organization will provide necessary infrastructure for the automated system.

Functional Requirements:

Data management:

- Maintain a database of products, including product details (size, color, brand), pricing.
- Store information about customers, including personal details and purchase history.
- Manage foreign branch data including branch details.

Order management:

- Capture and store order details including customer information, clothing selections and quantities.

Customer management:

- Customer information, including contact information, preferences, and purchase history, should be stored, and managed in the database.
- To guarantee data security and privacy, it ought to offer customer authentication.
- Reporting and analytics.
- Reports on internationally sales, consumer behavior, and other pertinent metrics ought to be produced by the database.

Non-functional Requirements:

Performance:

- For data retrieval and transaction processing, the database should provide fast response times.
- Should be capable of handling the user load and expected volume of data without significant performance drops.

Scalability:

- The database needs to be expandable in order to handle future increases in data volume, user base, and global branches.

Security:

- The database should provide data security and abide by global data protection laws.
- To protect sensitive data, it should allow user authentication, authorization, and access controls.
- In order to protect data both in transit and at rest, encryption techniques should be used.

Reliability and Availability:

- High availability should be provided by the database to reduce downtime and provide continuous access to crucial information.

- To guard against data loss or system failures, it should include backup and recovery techniques.

Risks contingency and Mitigation Strategies:

- Risk: Security Vulnerabilities and Data Breaches
  - Contingency: Protect sensitive data by putting in place strong security measures including encryption, access controls, and frequent security audits.

  - Mitigation: Observe data security best practices in the industry. Conduct regular penetration tests and vulnerability assessments. Employees should receive privacy and security training.

- Risk: Integrating with existing systems
  - Contingency: Conduct extensive integration testing, and via appropriate cooperation and communication with IT teams, ensure compatibility with current systems.

  - Mitigation: Establish precise integration standards and requirements. Work closely with IT teams to foresee potential problems in advance and create workable solutions.

- Risk: Resistance to change from employees
  - Contingency: The benefits of the automated system should be heavily emphasized during extensive training and support with change management for the staff.

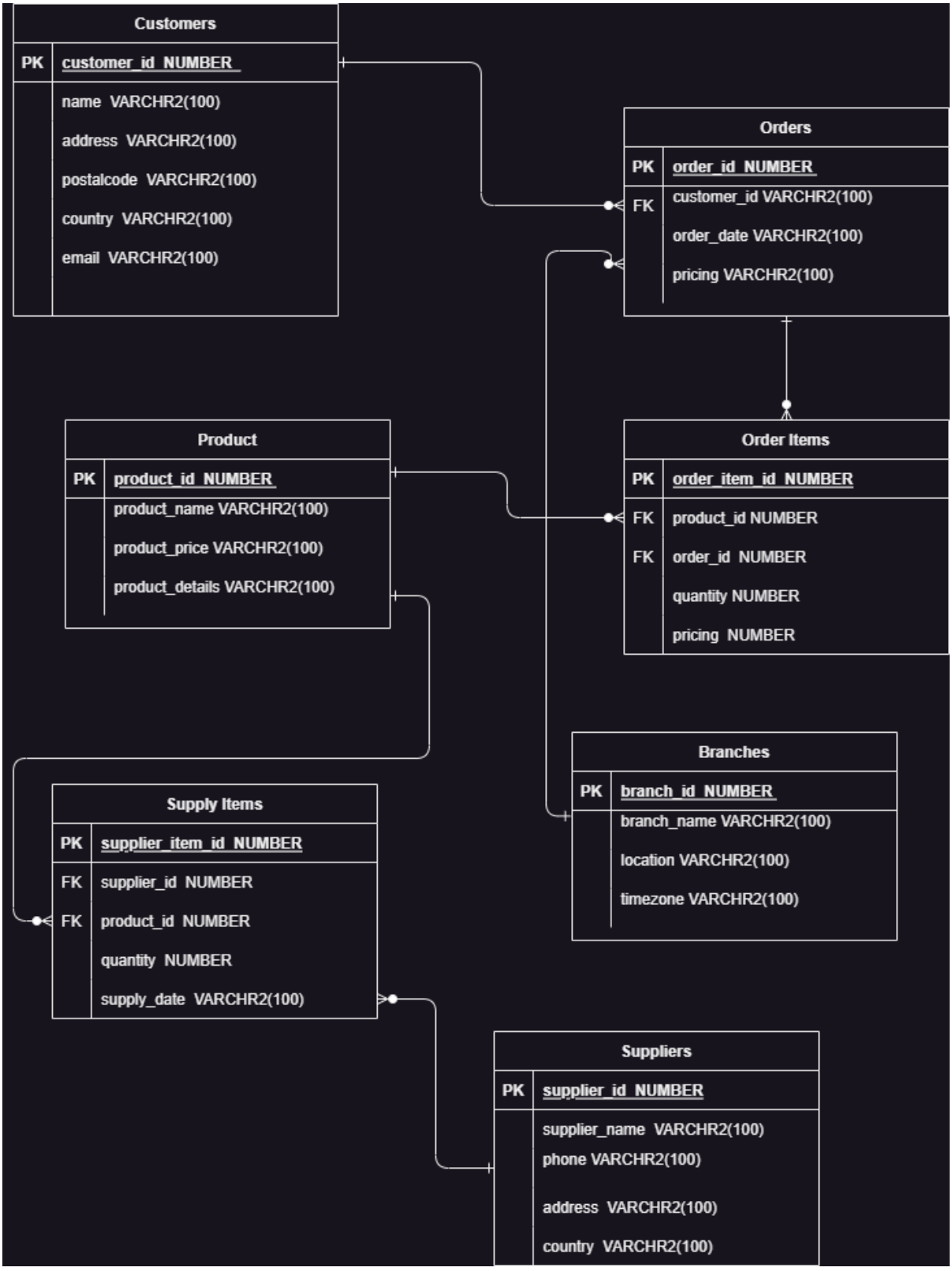
  - Mitigation: Engage staff members in the implementation process, address any issues they may have, and have frequent communication sessions. Provide rewards and acknowledgement for successful adoption.

Cost and Timeline:

- Cost: With the development costs, hardware and software expenses, training and maintenance, the estimated budget for the project will be approximately Rs. 2,000,000.

- TimeLine:
  - ✓ Starting date: 11/04/2023
  - ✓ Handover: 11/06/2023

2. ER Diagram


Customers
PK
customer_id NUMBER
name VARCHR2(100)
address VARCHR2(100)
postalcode VARCHR2(100)
country VARCHR2(100)
email VARCHR2(100)
Orders
PK
order_id NUMBER
FK
customer_id VARCHR2(100)
order_date VARCHR2(100)
pricing VARCHR2(100)
Product
PK
product_id NUMBER
product_name VARCHR2(100)
product_price VARCHR2(100)
product_details VARCHR2(100)
Order Items
PK
order_item_id NUMBER
FK
product_id NUMBER
FK
order_id NUMBER
quantity NUMBER
pricing NUMBER
Branches
PK
branch_id NUMBER
branch_name VARCHR2(100)
location VARCHR2(100)
timezone VARCHR2(100)
Supply Items
PK
supplier_item_id NUMBER
FK
supplier_id NUMBER
FK
product_id NUMBER
quantity NUMBER
supply_date VARCHR2(100)
Suppliers
PK
supplier_id NUMBER
supplier_name VARCHR2(100)
phone VARCHR2(100)
address VARCHR2(100)
country VARCHR2(100)

3. Test Logs

- Adding duplicate values

```
INSERT INTO Product VALUES (1,'Tropical shirt','Rs.3000','S,Blue,Armani');
```

```
Error starting at line : 172 in command -
INSERT INTO Product VALUES (1,'Tropical shirt','Rs.3000','S,Blue,Armani')
Error report -
ORA-00001: unique constraint (SYSTEM.SYS_C007858) violated
```

```
INSERT INTO Orders VALUES (30,03,'03/06','14500');
```

```
Error starting at line : 173 in command -
INSERT INTO Orders VALUES (30,03,'03/06','14500')
Error report -
ORA-00001: unique constraint (SYSTEM.SYS_C007862) violated
```

- Putting wrong data types

```
INSERT INTO Orders VALUES ('30',03,'03/06','14500');
```

```
Error starting at line : 173 in command -
INSERT INTO Orders VALUES ('30',03,'03/06','14500')
Error report -
ORA-00001: unique constraint (SYSTEM.SYS_C007862) violated
```

4. Reports based on selected query

```
SELECT oi.OrderItemId, p.ProductName, oi.OrderId, oi.Quantity, oi.Pricing
FROM OrderItems oi
JOIN Product p ON oi.ProductId = p.ProductId;
```

	ORDERITEMID	PRODUCTID	ORDERID	QUANTITY	PRICING
1	6	1	10	5	Rs.15000
2	7	3	30	6	Rs.16000

```
SELECT CustomerId, Name, Address, PostalCode, Country, Email
FROM Customer
```

	CUSTOMERID	NAME	ADDRESS	POSTALCODE	COUNTRY	EMAIL
1	1	Shan	69/9,Hatton	12500	Sri Lanka	shan@gmail.com
2	2	Onila	69/9,Kelaniya	12500	Sri Lanka	oni@gmail.com
3	3	Naveen	69/9,Melbourne	14500	Australia	nav@gmail.com
4	4	Emily Wilson	321 Pine Rd	24680	United States	emily@example.com
5	5	Michael Brown	654 Cedar Ln	97531	United States	michael@example.com
6	6	Sophia Davis	987 Maple Ave	75319	United States	sophia@example.com
7	7	William Taylor	135 Walnut St	90876	United States	william@example.com
8	8	Olivia Anderson	246 Cherry Dr	64203	United States	olivia@example.com
9	9	James Martinez	579 Pine St	32095	United States	james@example.com
10	10	Isabella Hernandez	802 Oak Ln	14703	United States	isabella@example.com

5. Report on possible data security issues

Introduction:

Based on the specified table structure, this report analyzes the security mechanisms put in place in the database system. Tables for branches, products, customers, orders, order items, suppliers, and supply items are included in the database. This paper assesses potential security threats and offers suggestions to strengthen database security.

1. Unauthorized Access

Issue: Database security is significantly at risk from unauthorized access, which can result in data breaches and compromised integrity.

Security Measures:

Implement role-based access control (RBAC) to provide users access capabilities depending on their responsibilities.

• Strong Authentication: Implement multi-factor authentication and enforce strong password restrictions.

• Secure Network Configuration: To defend against external threats, use firewalls and intrusion detection/prevention systems.

Risk mitigation: Organizations can limit access to authorized workers and thwart unauthorized data access by putting RBAC, strong authentication, and secure network configurations into place.

2. Data leakage

Issue: Attackers can take advantage of input validation flaws and run unauthorized SQL queries by using SQL injection.

Security measures:
• Parameterized Queries: To prevent code injection, use parameterized queries or prepared statements.
• Input Validation and Sanitization: Use effective input validation and sanitization methods to reduce the hazards associated with injection.
• Regular Software Updates: Stay current with the DBMS and related software to fix known vulnerabilities.

Risk mitigation: Organizations can reduce the risk of data leaking by imposing access rules, encryption, and frequent security audits.

3. Weak authentication

Issue: Weak authentication procedures make it simpler for attackers to access the database without authorization.

Security Measures:
• Strong Password Policies: Require long, complex passwords that expire on a regular basis.
Implement multi-factor authentication (MFA) to offer an extra layer of protection.

Risk Mitigation: Organizations may strengthen authentication and lower the risk of unwanted access by installing MFA and enforcing strong password practices.

4. Insecure Network Configurations

Issue: Unauthorized access or data interception can result from insecure network setups.

Security Measures:
Implement firewalls to keep an eye on and regulate incoming and outgoing network traffic.
• Intrusion Detection/Prevention Systems: Use IDPS to monitor networks for attacks and stop them.

Risk Mitigation: Organizations can defend the network perimeter and lessen potential external threats by using firewalls and IDPS.

6.Conclution

The RR clothing store may optimize operations, boost accuracy, and speed up turnaround times by automating order processing and customer management.
Through reliable reporting and analytics, the interface with existing systems, such as CRM and ERP, guarantees seamless data flow and improves decision-making.

The document lists a number of concerns, including employee reluctance to change, problems integrating with current systems, security flaws, technological problems, and incomplete or erroneous data movement.
However, suitable risk-reduction and mitigation measures are put forth to effectively address these dangers.

Overall, RR Clothing Store will gain a variety of advantages from the automation of manual business processes through the suggested database and data structures, including higher efficiency, improved customer satisfaction, cost savings, and a competitive edge in the market. To ensure the project is implemented successfully, it is

essential to address the identified risks, apply the recommended security measures, and stick to the set timetable and budget.

THANK YOU