Business Intelligence and Business Analytics

Topic:

Business Analysis and Implementation for VMR Auto Garage (Specification)

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1. BACKGROUND

The auto industry is one of the biggest and most complex industries in the world. A major part of the auto industry is the aftermarket section. The aftermarket section is responsible for the supply and installation of all motor parts after the sale of the vehicle by the manufacturers. The automotive service (car repairs and maintenance) industry generates about 45% of the entire aftermarket revenue in Europe with a global market size estimated to reach USD810.30 Billion by 2026 (Reports & Data, 2019). The remaining 55% of the revenue is made up of the retail and wholesale of car parts. These two vital parts of the auto industry generated a combined total of over 681 billion Euros in 2015 which was about 20% of the entire auto industry revenue at the time.

VMR Auto Garage is a medium-sized player in the automotive service in Ireland. VMR was established in the year 2010 and it is a private-owned auto service shop located in the heart of Dublin, Capital of Ireland. VMR currently has a client base of over 5,000 customers serviced by an in-house team of 29 staff members and is looking to expand to neighbouring counties in Ireland. As part of their expansion plans, the management of VMR is looking at automating some of its processes, manage customers better by providing seamless communications and also understand easily how the company is performing in terms of revenue generated from goods sold and services rendered. The management of VMR would also like an assessment of their existing services and how well their internal processes align with the company's goals and objectives.

This project is focused at using business intelligence tools to gain insight into the company's activities, revenue generated from goods sold and services rendered, customer management and retention and what areas of the business can be improved upon to increase revenue.

The project will also try to understand what market share the company currently holds by trying to identify the entire market volume and comparing that with the company's revenue. The project will also identify areas to improve on by looking into the company's competitors like Car Service Ireland, BestDrive by Continental, and Atlas Auto Service all located within Ireland.

The project will adopt a number of ERP tools to help improve the company's operations. Some of these tools include:

a. CRM used for:
    i. Managing incoming and outgoing communication between the company and their clients
    ii. Tracking customer retention
    iii. Identifying active and inactive clients

b. SCM will be used for:
    iv. Monitoring inventory levels of all car parts in the store
    v. Avoiding stock out of commonly used parts
    vi. Understanding the profit margin of each car part in the inventory.

2. System Design and Analysis

Systems Analysis and Design (SAD) is a common term used to describe techniques for designing high-quality software system that integrates information technology, people and data to meet business needs.

The following consist of the system analysis and design used in VMR Auto garage to improve their business:

I. SWOT Analysis

SWOT analysis is a used to show the company's **S**trengths, **W**eaknesses, **O**pportunities and **T**hreats by providing thorough insights into all the aspects involved in making a business decision. Before proceeding to any sort of strategic activity, whether pursuing new initiatives, re-engineering organizational policies, evaluating ways to adjust or change a plan halfway in its execution, a SWOT analysis should be carried out.

Figure 2-1: SWOT Analysis

The SWOT analysis done on VMR Auto garage was used to identify recommendations and approaches, with emphasis on leveraging strengths and opportunities to outweigh the weaknesses and threats as shown in Figure 2-1 above.

II. GAP ANALYSIS

The main aim of the gap analysis is used to measure the difference between the company's present performance and the company's proposed performance. The gap analysis helps us to identify and outline the steps needed to take the company from where it currently is to where we hope to be. In addition, it can also be used to estimate future performance of the company is changed and where the company would ideally want to be.

The following are GAP Analysis Perspective:

1. Organization: The describes skill set or job roles that are missing within the company. In this case, the front desk officer lacks the knowledge of proper CRM tools like Dynamics 365.
2. Business Direction: describes a gap in products, services and how to potentially increase market share. VMR is looking to review their services to feature more services and also merge some services based on revenue by each service.
3. Business Process: describes processes in the company that can be improved. VMR seeks to improve processes like communication with clients, tracking and visualizing revenue generated by each service rendered, identifying frequent customers to grant discounts.
4. Technology: describes the systems or technologies that need to be implemented in the company. VMR is in need to a proper CRM tool to manage communication with customer and also to properly track income.

Table:

	Current State	Desired Future State	GAPS	Remedies
Team/ Training	1. No knowledge about ERP systems.	Gain knowledge on how to use CRM tools	Knowledge GAP	Conduct training for relevant personnel
Services	2. Currently renders only 4 services. 3. Hard to know what services to merge as revenue stream visualization is difficult	Increase number of services offered. Merge the 2 services that generate the lowest revenue.	Insight	Improve services
Processes	4. It takes a long time to gather insight from record and visualize revenue stream.	Easily gather insight from records and visualize revenue stream	Process improvement	Implement data visualization tool
Technology/ Tools	5. Data is stored in excel spreadsheet. 6. No consolidation of communication with client.	Store data in a MySQL or Postgres database Make is easier to track communication with client	Lack of adequate technology	Implement proper database and CRM tool

III. Business Process Model and Notation (BPMN)

A part of the analysis carried out on the company was the business process analysis which looked into the way the company operates on a "normal" business day. The Business Process Model and Notation (BPMN) is a diagrammatic illustration of the business processes of an entity or company. Figure 2-2 below shows the BPMN of the company. With this we are able to easily identify that this is almost no automated process in the company- from the customer's appointment to the point of billing the customer. This has a major effect on the turnaround time for each client, thus affecting customer retention.

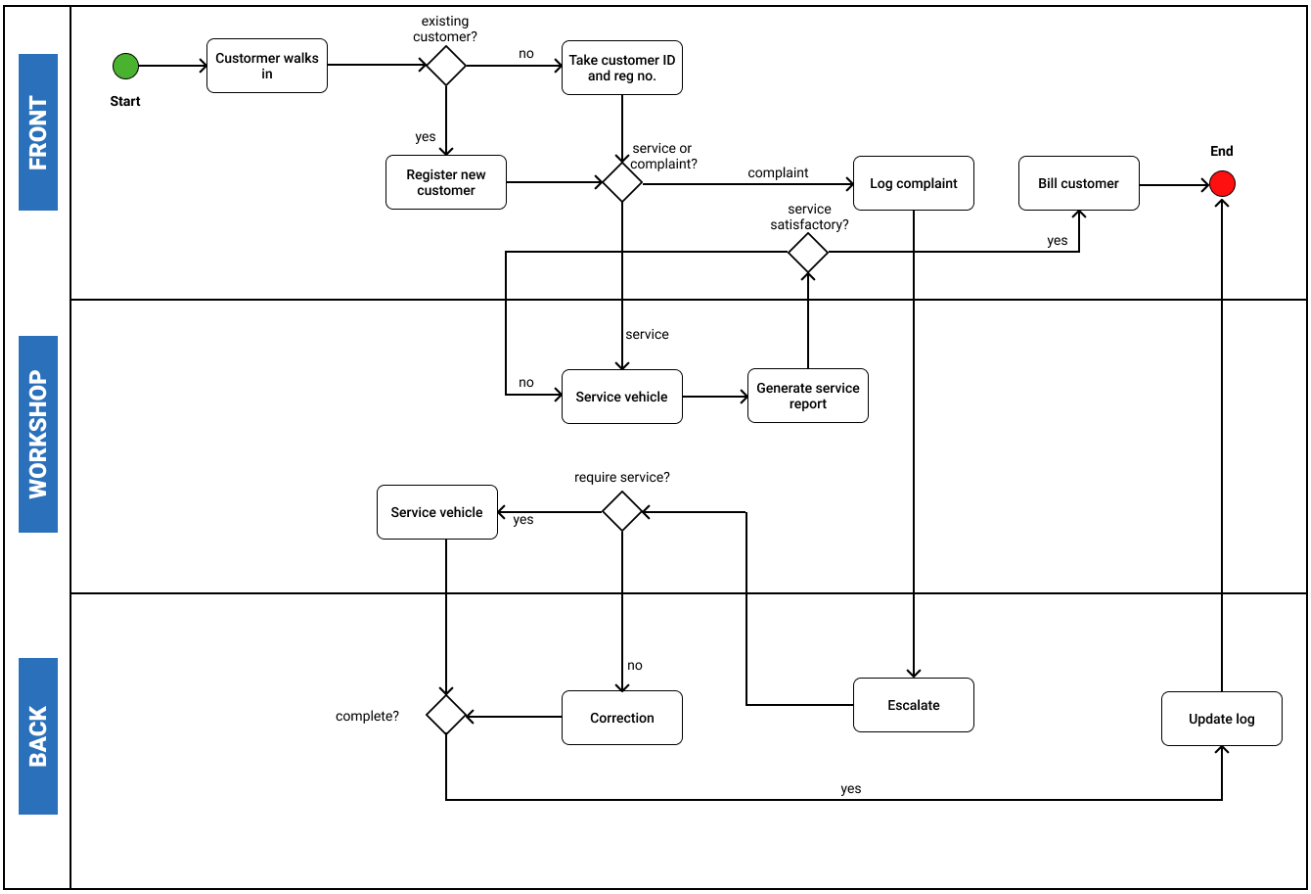


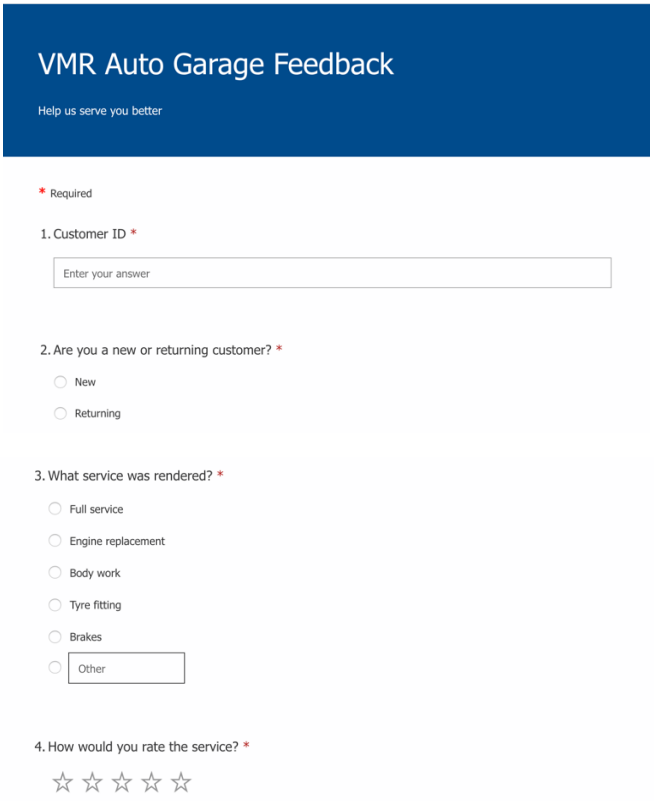
Figure 2-2: BPMN

IV. Customer Feedback Module

A vital part of Customer Relationship Management is interaction with customers. It is necessary to collect feedback from customers to capture their thoughts and experience about the products and services they have received (Forbes, 2011). The essence of recording feedback from customers is to identify areas within the business that may be potential "weak links" and/or "strong points" in delivering processes.

VMR has adopted this feature to capture the thought of their customers in order to improve their services to ensure higher customer satisfaction. The customer feedback form was designed using the Microsoft Forms Pro. It captures the following:

1. Customer ID
2. New or Returning customer
3. Type of service received
4. Overall rating of service
5. Thoughts on each aspect of the service
6. Likelihood of recommendation
7. Comment



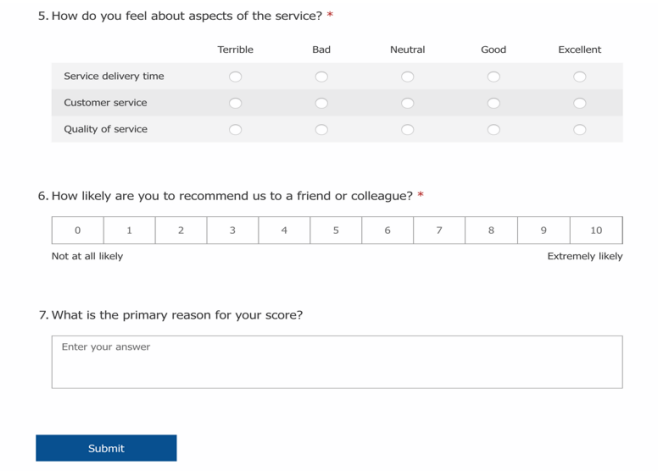


Figure 2-3: Customer Feedback form

3. DATABASE DESIGN

The datasets consist of the following tables which are explained below:

a. Customers: this dataset consists of the information about the clients of VMR Auto garage. It has 5 columns, namely customer identification number, first name, last name, email and phone number of each customer. The customer identification number is the unique identifier of the customer table.

b. Car: the car table consists of the information about brands and model of cars of the customers. It includes the registration number, customer identification number, model, make and year of the car. The registration number is its primary key and it has customer identification number as its foreign key that links with the customers.

c. Services: this contains the information of the services rendered by the VMR Auto garage. It has the service identification number, service cost and the service description. Its unique identifier is its service identification number.

d. Parts: it contains the information about all the parts that are sold by the VMR auto garage. This information includes the parts identification number, part name, cost of each part, the quantity available. The part identification number is its primary key while the service identification number is a foreign key that links it with the services.

e. Inventory: the inventory table contains the quantity of available parts in stock. The information includes the inventory identification number, and quantity available. The inventory identification number is its primary key and the part identification number is a foreign key in the inventory table that links with the parts.

f. Billings: it contains information that shows the various price of services a customer receives and the breakdown of the list of services that was carried out. The information

includes the billing identification number, customer identification number, service identification number, registration number, parts identification number, the date and amount. The billing identification number serves as the unique identifier while the customer identification number, service identification number, registration number and parts identification number all serve as the foreign key.

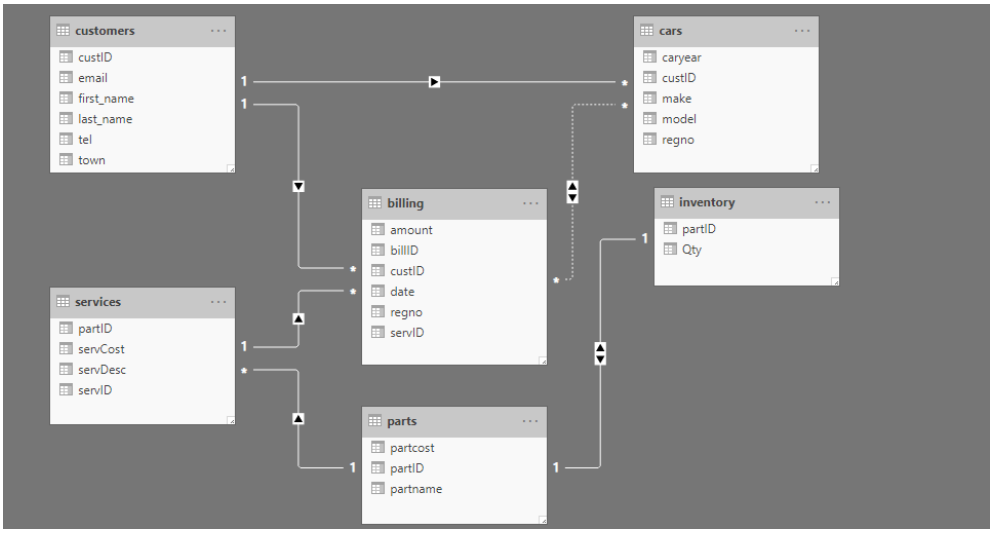


Figure 3-1: Entity Relationship Diagram

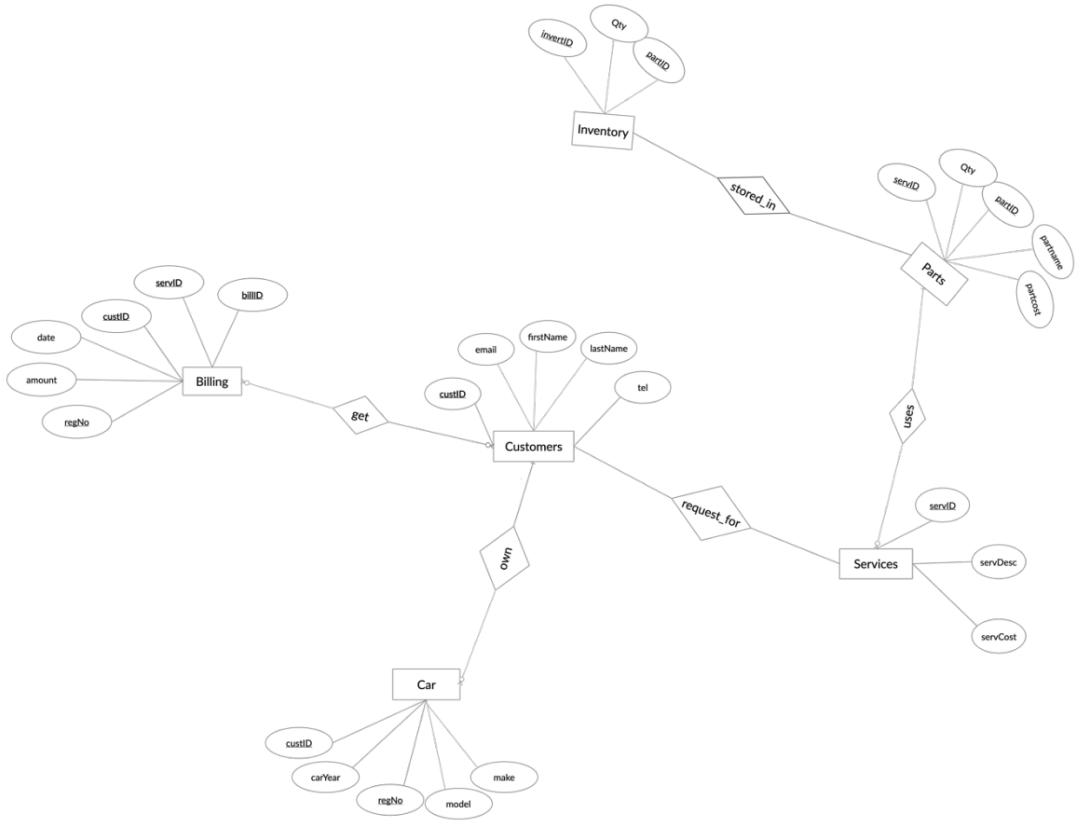


Figure 3-2: Logical Entity Relationship

4. DATA DICTIONARY

Data dictionary is a centralized metadata repository. It shows a compilation of information that describes the content, structure and format of the database such as field name, type of data, description etc. and the interaction between its elements. It is used to manage access and control the database.

	Field Name	Type	Description	Required	Unique	Key(s)
Customer	custID	VARCHAR (25)	Customer's identity number	YES	YES	PK
	firstName	VARCHAR (25)	Customer's first name	YES	NO	
	lastName	VARCHAR (25)	Customer's last name	YES	NO	
	email	VARCHAR (25)	Customer's email address	YES	NO	
	tel	INT (11)	Customer's telephone number	NO	NO	
Car	regNo	VARCHAR (15)	Customer's car registration number	YES	YES	PK
	custID	VARCHAR (15)	Customer's identity number	YES	NO	FK
	model	VARCHAR (15)	Model of the customer's car	YES	NO	
	make	VARCHAR (15)	Make of the customer's car	YES	NO	
	carYear	INT (4)	Year the brand of the customer's car was made	YES	NO	
Services	servID	VARCHAR (15)	Customer's service identity number	YES	YES	PK
	servCost	INT (15)	Service cost of what the customer will get	YES	NO	
	servDesc	VARCHAR (50)	Detailed service description note of what the customer will get	NO	NO	
Parts	partID	VARCHAR (15)	Parts' identity number	YES	YES	PK
	servID	VARCHAR (15)	Customer's service identity number	YES	NO	FK
	partname	VARCHAR (50)	Name of the part	YES	NO	
	partCost	INT (15)	Amount the part cost	YES	NO	
	qty	INT (15)	Number of parts left	YES	NO	
Inventory	inventID	VARCHAR (15)	Billing identity number to a customer	YES	YES	PK
	partID	VARCHAR (15)	Parts' identity number	YES	NO	FK
	qty	INT (20)	Number of parts left in stock	YES	NO	
Billings	billID	VARCHAR (15)	Inventory identity number	YES	YES	PK
	custID	VARCHAR (15)	Customer's identity number	YES	NO	FK
	servID	VARCHAR (15)	Customer's service identity number	YES	NO	FK
	regNo	VARCHAR (15)	Customer's car registration number	YES	NO	FK
	partID	VARCHAR (15)	Parts' identity number	YES	NO	FK
	date	DATE (10)	Date the billing was made	YES	NO	
	amount	INT (20)	Amount on the customer's invoice	YES	NO	

Figure 4-1: Data Dictionary

The Data dictionary above shows all fields with descriptions and other properties. This also specifies the values for every element of the data. This helps to evaluate all the data elements that are involved in the company project. The only downside of data dictionary is that it is a time-consuming model of multiple information being displayed together. Nevertheless, in every business organization, this model plays an essential role for analysts to explore and apply research.

5. REFERENCES

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