National College of Ireland

Project Submission Sheet – 2020/2021

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Lecturer:	PROF. VIKAS SAHNI
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Word Count:	……

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.
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Signature: Jignesh, Tushar, Ritika, Prathamesh

Date: 20-12-2020

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Business Intelligence & Business Analytics Project Specification Report

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I. OBJECTIVE

To propose a simple, cost-efficient, and scalable system solution using the Business analytics for Amica Mutual Insurance Company. As a part of the Business Intelligence team, we would be studying the structure of the firm, its marketplace, and the previous data to get meaningful insights and propose the system solution.

II. HISTORY AND MARKETPLACE OF AMICA

Fig 2.1 Amica Logo

Amica is a mutual insurance company from Lincoln, RI, USA. It is one of the oldest automobile insurance providers in the USA which was founded in 1907 by A.T.Vigneron. The company started with automobile, fire, and theft insurance products and now it offers various products and services like house, auto marine, and life insurance as well. It is a well-recognized insurer in the insurance industry in the USA. “To create peace of mind and build enduring relationships” is the mission statement of Amica and the firm has reflected that from its increasing market share over the century.[1] Currently, Amica offers all their products through online platforms and has office premises at 44 locations throughout the states.

Significant insights about Amica:

- Initially known as Automobile Mutual Insurance Company of America (Amica) was a mutual insurance company as it was owned by policyholders and not by shareholders.[2]
- In 1941 Amica opened its first branch in Boston.[3]
- In 2019 Amica claimed to have an asset value of about 5.4 billion USD and a policy count of 1.5 million.[3]
- The firm has 3 subsidiaries as following.[3]
  1. Amica Life Insurance Company
  2. Amica Property and Casualty Insurance Company
  3. Amica General Agency, LLC.
- Amica ranked number one in customer satisfaction by J.D.Power. It is the first company to earn 50 J.D.Power customer satisfaction awards. [4]
- It has a Complaint index of 1.41.[4]
- The company offers various types of discounts which results in lower insurance premiums.[4]

Competitors of Amica: Amica has many competitors from the USA financial market like Arbella Insurance, sentry, state farm, and many more. The major factor which makes Amica different from its rivals is better customer service, a higher rate of discounts, and extra perks to its customers. Some of the competitors are mentioned below.

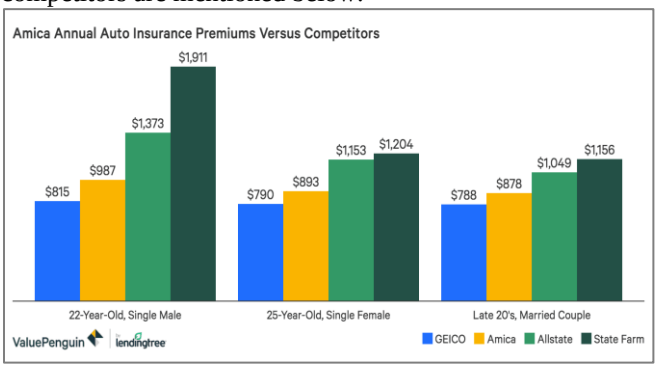


Fig 2.2 Financial Insights of Amica

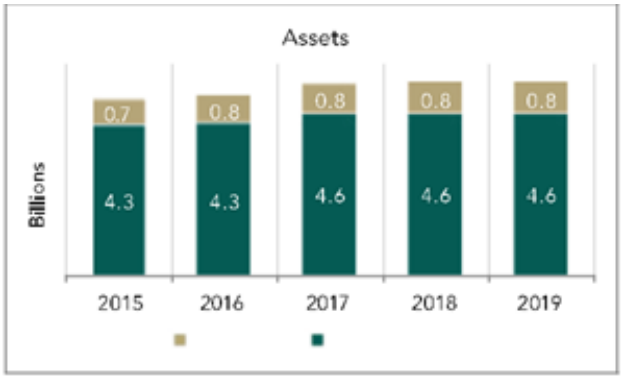


Fig 2.3

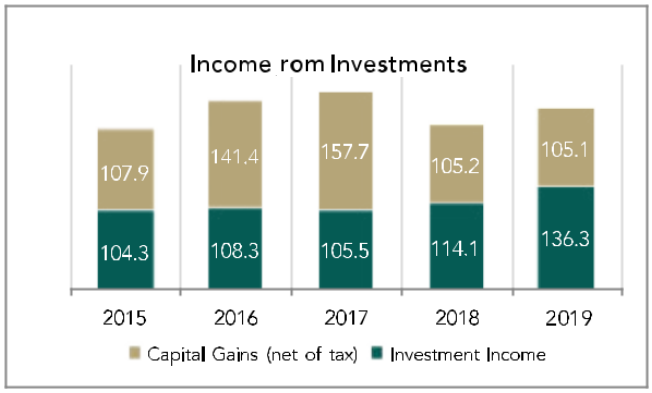


Fig 2.4

III. LOCATIONS COVERED BY AMICA THROUGHOUT THE STATES

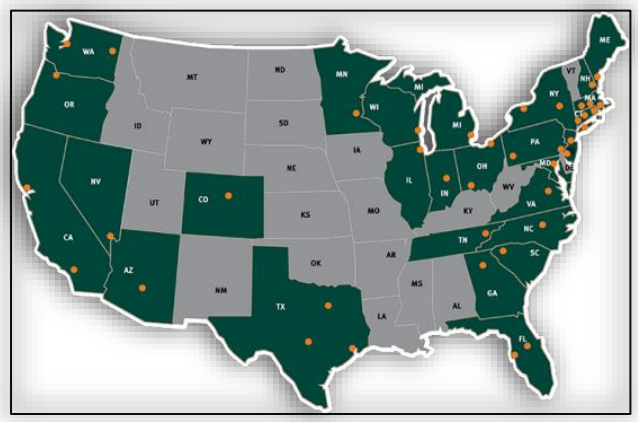


Fig 3.5

IV. CRM

CRM stands for "customer relationship management". The main purpose of CRM is to record, track, and handle client and prospect interactions all under one roof.

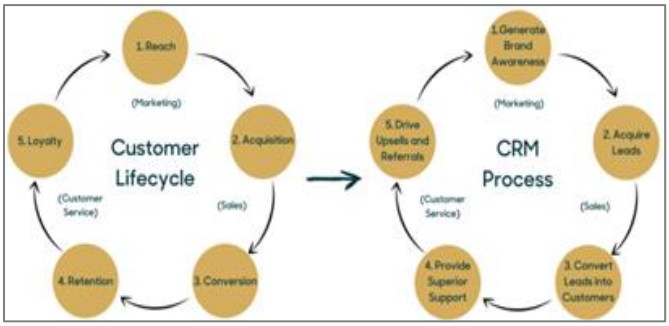


Fig 4.1

When data is gathered, analysed, and utilized beyond the sales department, the value of CRM increases. To accomplish this, however, companies will have to explore outside simple analytics. That is where business intelligence becomes functional.

Business intelligence is not just a single piece of software, but more of a set of procedures to obtain useful information from multiple data points. With the help of Business intelligence, we can generate new reports, dashboards, key performance indicators (KPIs), charts, graphs, and more. It reveals what an organization is doing correctly, and which pain points or key areas to address. Best of all, these strategic reports support decision-makers and executives within enterprises. There is no guessing left when it comes to business intelligence.

There is nothing as annoying to an insurance customer than a lengthy, dragged claims process — and it is obvious to guess why: For most customers, claim symbolizes the vital reimbursement for what could be a painful event, such as a car accident, property destruction, or physical injury. An efficient claims process is key to the victory of any insurance company as it results in both, the rise of customer satisfaction as well as the reduction in losses. An enhanced claim process also facilitates agents to settle open claims much quicker, so they can devote their interest to a greater number of customers.

Insurance business intelligence solutions provide claims handlers with a universal picture of crucial business processes and performance. By integrating business intelligence software with customer relationship management (CRM) systems, insurance companies can provide their claim handlers with data containing comprehensive customer reports. Claim handlers can use this facility to assess customers' previous claims and other important information and to expedite their services, along with a highly customized customer experience.

V. SYSTEM DESIGN

System design is the process of defining the elements of a system such as the architecture, modules, and components, the different interfaces of those components, and the data that goes through that system. System Design determines the "look and feels" of all system outputs, inputs, interfaces, and data requirements

Components of a System Design:

1. *OUTPUT DESIGN*

The objective is to provide the correct information to the appropriate audience in the correct format at the proper time.

Objectives	Guidelines
Focused, Significant, Sufficient, Well-divided, Well-timed	Keeping display output uncomplicated, steady, easy to traverse, and appealing. Considering practical and artistic aspects in creating reports and visualizations.

Table 5.1

2. *INPUT & DATA ENTRY DESIGN*

The objective is to build a user-friendly interface and set of processes to get quality data into the system in a precise and timely manner.

Objectives	Guidelines
Precise, Easy, Reliable input, Efficient data capture, Effective input validation	Keeping screens easy, constant, navigation friendly, and attractive. Reducing data input volume by inputting required data only and providing default values wherever applicable. Minimizing data input error by validating the input for missing invalid or duplicate data

Fig 5.2

3. *INTERFACE/DIALOGUE DESIGN*

The objective is to set the approach (process and order) in which individuals and the system exchange data.

Objectives	Guidelines
Effective feedback to users, Productivity enhancement	Minimizing user disappointment by standard operation, adequate help, minimal user action, enhanced communication. Proving feedback in the form of acknowledgments, warnings, status, availability of further assistance.

Fig 5.3

4. *DATA MODELLING*

The objective is to represent data in the correct form that can be easily used by a DBMS (database management system)

Objectives	Guidelines
Retrieval of meaningful information, Efficient storage of data, Easy data update,	Using the ER diagram for data modeling. Validating all the tables by standardizing them.

Fig 5.4

VI. DATABASE DESIGN:

Database Design is nothing, but the administration of all data stated by the database model. The architect of database design decides how all data components interrelate and which data should be stored. Database Design includes recognizing the interrelationship and categorizing the data. Database design is one of the significant segments for analysis and administration of data stage to construct productive business application software.

ER-DIAGRAM:

Database Design part comprises of ER(Entity-Relationship) diagram. With the help of an ER diagram, we can draft the database in a well-organized manner.

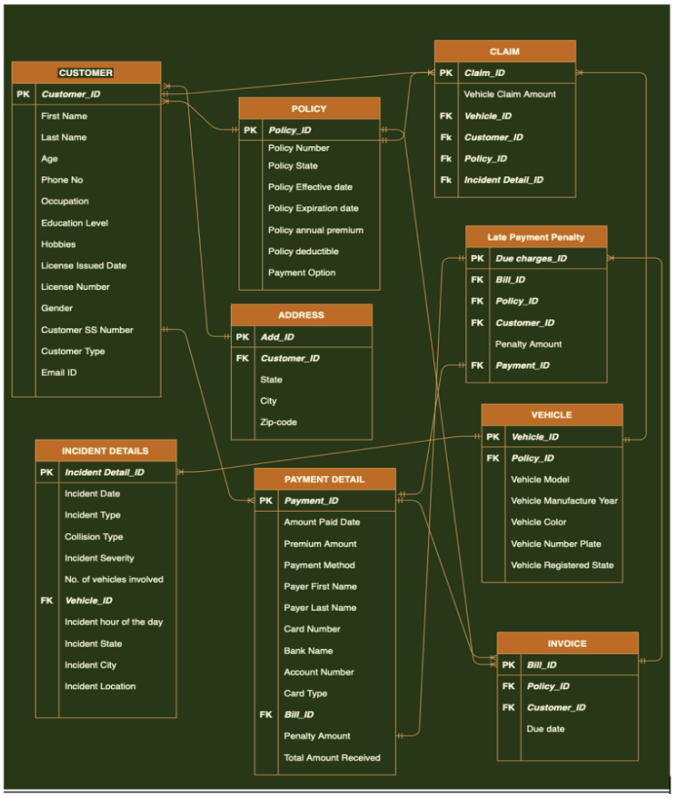


Fig 6.1

DATABASE DICTIONARY:

CUSTOMER TABLE:

This table holds the demographic information of the customer. It contains 14 columns as shown below figure.

Field Name	Data Type	Description	Is Key ?	Type (Measure/Dimension)
Customer_ID	Text	Unique Customer ID	Primary Key	Dimension
First Name	Text	Customer First Name	NA	Dimension
Last Name	Text	Customer Last Name	NA	Dimension
Age	Whole Number	Customer Age	NA	Dimension
Phone No	Whole Number	Customer Phone No	NA	Dimension
Occupation	Text	Customer Occupation	NA	Dimension
Education Level	Text	Customer Education	NA	Dimension
Hobbies	Text	Customer Hobbies	NA	Dimension
License Issued Date	Date	Customer License date	NA	Dimension
License Number	Whole Number	Customer License No	NA	Dimension
Gender	Text	Customer Gender	NA	Dimension
Customer SS Number	Whole Number	Customer Social Security Number	NA	Dimension
Customer Type	Text	Customer taking policy for individual or corporate	NA	Dimension
Email ID	Text	Customer Email ID	NA	Dimension

Table 6.1

ADDRESS TABLE:

This particular table includes the address of the customer, which involves state, city, zip-code. The table contains 5 columns.

Field Name	Data Type	Description	Is Key ?	Type (Measure/Dimension)
Add_ID	Text	Unique Address-ID	Primary Key	Dimension
Customer_ID	Text	Unique Customer ID	Foreign Key	Dimension
State	Text	State where Customer Stays	NA	Dimension
City	Text	City where Customer lives	NA	Dimension
Zip-Code	Whole Number	Zip-code for particular city	NA	Dimension

Fig 6.2

CLAIM TABLE:

This particular table holds policy claim details. Customer processing the application to the insurance company to get the amount which helps them for paying their damage of vehicle in the accident which is covered in the Customer policy. All the required columns for giving claims to customers are involved in this dataset. The table contains 6 columns.

Field Name	Data Type	Description	Is Key ?	Type (Measure/Dimension)
Claim_ID	Text	Unique Claim ID	Primary Key	Dimension
Vehicle Claim Amount	Whole Number	Claim amount for Vehicle	NA	Measure
Vehicle_ID	Text	Unique Vehicle ID	Foreign Key	Dimension
Customer_ID	Text	Unique Customer ID	Foreign Key	Dimension
Policy_ID	Text	Unique Policy ID	Foreign Key	Dimension
Incident Detail_ID	Text	Unique Incident ID	Foreign Key	Dimension

Fig 6.3

POLICY TABLE:

This particular table contains detailed information regarding one-year motor policies which the company provides to its customers. It contains 8 columns as shown below figure.

Field Name	Data Type	Description	Is Key ?	Type (Measure/Dimension)
Policy_ID	Text	Unique Policy ID	Primary Key	Dimension
Policy Number	Whole Number	Different Policy Number	NA	Dimension
Policy State	Text	Customer Policy State	NA	Dimension
Policy Effective Date	Date	Start date for Policy	NA	Dimension
Policy Expiration Date	Date	End date for Policy	NA	Dimension
Policy Annual Premium	Whole Number	Total Policy amount	NA	Measure
Policy Deductible	Whole Number	Policy deductible amount	NA	Dimension
Payment Option	Text	Different option for policy payment	NA	Dimension

Fig 6.4

INCIDENT DETAILS TABLE:

This table contains all the accident information of the particular vehicle which has been occurred. The table has 11 columns in it.

Field Name	Data Type	Description	Is Key ?	Type (Measure/Dimension)
Incident Detail_ID	Text	Unique Incident detail ID	Primary Key	Dimension
Incident Date	Date	Particular date on which incident taken place	NA	Dimension
Incident Type	Text	Which type of incident is occur	NA	Dimension
Collision Type	Text	Which type of collision	NA	Dimension
Incident Severity	Text	Is incident major or minor	NA	Dimension
No of Vehicle invloved	Whole Number	How many vehicles are involved in the accident	NA	Dimension
Vehicle_ID	Text	Unique Vehicle ID	Foreign key	Dimension
Incident hour of day	Whole Number		NA	Dimension
Incident State	Text	State in which incident has happen	NA	Dimension
Incident City	Text	City in which incident has happen	NA	Dimension
Incident Location	Text	Location of accident	NA	Dimension

Fig 6.5

PAYMENT DETAIL TABLE:

The Payment table represents the finance flow of the customer such as policy premium amount paid, penalty amount, the total amount received to the company, customer bank details. The table contains 13 columns.

Field Name	Data Type	Description	Is Key ?	Type (Measure/Dimension)
Payment_ID	Text	Unique Payment Id	Primary Key	Dimension
Amount Paid Date	Date	Date on which amount is been paid	NA	Dimension
Premium Amount	Whole Number	Total Amount	NA	Measure
Payment Method	Text	By which payment method transaction is done	NA	Dimension
Payer First Name	Text	Payer First Name	NA	Dimension
Payer Last Name	Text	Payer Last Name	NA	Dimension
Card Number	Whole Number	Payer Card Number	NA	Dimension
Bank Name	Text	Payer Bank Name	NA	Dimension
Account Number	Whole Number	Payer Account No	NA	Dimension
Card Type	Text	Which type of card is use for transaction	NA	Dimension
Bill_ID	Text	Unique Bill ID	Foreign Key	Dimension
Penalty Amount	Whole Number	Late payment penalty amount	NA	Measure
Total Amount Received	Whole Number	Total amount received from customer	NA	Measure

Fig 6.6

VEHICLE TABLE:

This table contains all the vehicle information on which the policy is been issued. The table has 7 columns.

Field Name	Data Type	Description	Is Key ?	Type (Measure/Dimension)
Vehicle_ID	Text	Unique Vehicle ID	Primary Key	Dimension
Policy_ID	Text	Unique Policy ID	Foreign Key	Dimension
Vehicle Model	Text	Name of the Vehicle	NA	Dimension
Vehicle Manufacture Year	Whole Number	Year is which Vehicle is manufacture	NA	Dimension
Vehicle Color	Text	Color of Vehicle	NA	Dimension
Vehicle Number Plate	Text	Vehicle Number	NA	Dimension
Vehicle Registered State	Text	Is Vehicle Registered or not	NA	Dimension

Fig 6.7

LATE PAYMENT PENALTY TABLE:

This table keeps the records of the penalty amount which has to be imposed if a customer fails to pay the policy premium amount on time.

Field Name	Data Type	Description	Is Key ?	Type (Measure/Dimension)
Due charges_ID	Text	Unique Due Charges ID	Primary Key	Dimension
Bill_ID	Text	Unique Bill ID	Foreign Key	Dimension
Policy_ID	Text	Unique Policy ID	Foreign Key	Dimension
Customer_ID	Text	Unique Customer ID	Foreign Key	Dimension
Penalty Amount	Whole Number	Late payment penalty amount	NA	Measure
Payment_ID	Text	Unique Payment ID	Foreign Key	Dimension

Fig 6.8

INVOICE TABLE:

The Invoice table holds the summary of the Payment table and Late payment penalty table activities. This table contains 5 columns.

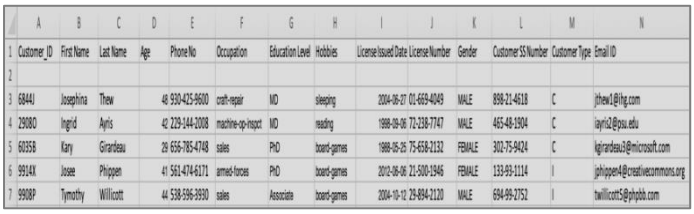
Field Name	Data Type	Description	Is Key ?	Type (Measure/Dimension)
Bill_ID	Text	Unique Customer Bill ID	Primary Key	Dimension
Policy_ID	Text	Unique Customer Policy ID	Foreign Key	Dimension
Customer_ID	Text	Unique Customer ID	Foreign Key	Dimension
Due Date	Date	Date by which payment should be done	NA	Dimension

Fig 6.9

TEST DATA:

The Insurance data is been extracted from Kaggle for reference and many new columns were added with the help of mockaroo[5]. These all-new columns were added by seeing the requirements in the business.

- *CUSTOMER TABLE:*



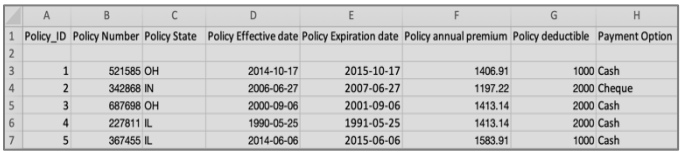
- *ADDRESS TABLE:*

	A	B	C	D	E
1	Add_ID	Customer_ID	State	City	Zip-code
2					
3	Add93	6844J	WA	Washington	5609
4	Add72	2908O	VA	Virginia	99260
5	Add98	6035B	TX	Texas	22047
6	Add92	9914X	MI	Michigan	77070
7	Add77	9908P	MI	Michigan	48505

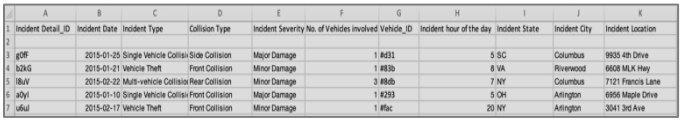
- *CLAIM TABLE:*

	A	B	C	D	E	F
1	Claim_ID	Vehicle Claim Amount	Vehicle_ID	Customer_ID	Policy_ID	Incident Detail_ID
2						
3	o652301	52080	#d31	6844J	1	g0fF
4	u737825	3510	#83b	2908O	2	b2kG
5	n364721	23100	#8db	6035B	3	l8uV
6	i376943	50720	#293	9914X	4	a0yl
7	z981557	4550	#fac	9908P	5	u6uJ

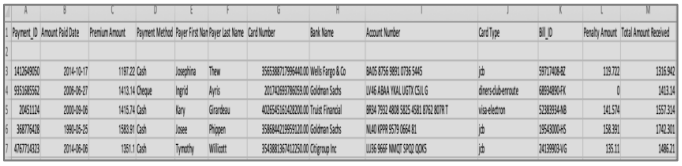
- *POLICY TABLE:*



- *INCIDENT DETAIL TABLE:*



- *PAYMENT DETAIL TABLE:*



- *VEHICLE TABLE:*

	A	B	C	D	E	F	G
1	Vehicle_ID	Policy_ID	Vehicle Model	Vehicle Manufacture Year	Vehicle Color	Vehicle Number Plate	Vehicle Registered State
2							
3	#d31	1	92x	2004	Indigo	WXZ-835	NO
4	#83b	2	E400	2007	Green	GFD-462	NO
5	#8db	3	RAM	2007	Goldenrod	JZG-830	NO
6	#293	4	Tahoe	2014	Mauv	QGY-399	NO
7	#fac	5	RSX	2009	Orange	ODY-727	NO

- *LATE PAYMENT PENALTY TABLE:*

	A	B	C	D	E	F
1	Due charges_ID	Bill_ID	Policy_ID	Customer_ID	Penalty Amount	Payment_ID
2						
3	356JDddU	59717408-BZ	1	6844J	119.722	1412649050
4	860ENNeL	68934890-FK	2	2908O	0	9351685562
5	518ISG7J	52383934-NB	3	6035B	141.574	20451124
6	318LHGbT	19543000-HS	4	9914X	158.391	368776428
7	491SYXXE	24139903-VG	5	9908P	135.11	4767714323

- *INVOICE TABLE:*

	A	B	C	D
1	Bill_ID	Policy_ID	Customer_ID	Due Date
2				
3	59717408-BZ	1	6844J	2014-10-17
4	68934890-FK	2	2908O	2006-06-27
5	52383934-NB	3	6035B	2000-09-06
6	19543000-HS	4	9914X	1990-05-25
7	24139903-VG	5	9908P	2014-06-06

VII. ANALYTICS REQUIRMENTS

The key part of the process is reporting. It is a system consisting of the detection, analysis, and communication of the different patterns found in data. It enables us to analyse and execute the functions internally present for the software and performance investment, to receive the output and the records. In other words, the data relationships and the organization's decision may be represented by analytics.

- **Business Requirements:** These are the most important criteria that are gathered from the organization or the customer side and makes it important to determine the future strategy or phase of the current project. The specifications describe the system's functionality from start to end. Items,

services, applications, and the fulfillment of standards are the key to achieving customer satisfaction.

- **Architectural and Design requirements:** Broadly speaking, this is often regarded as a definition of buildings and other distinct structures. For the execution of the business process, all characteristics of the structure and the design are concerned.

  For instance, the architectural and design model specifications for the database and ER diagram of the Amica model.

- **System and Integration requirements:** The criteria of this data are connected to the definition of all specifications. The source of information that offers comprehensive business process information could be in any format.

VIII. REFERENCES

[1] https://www.amica.com/en/about-us/mission-statement.html

[2]https://en.wikipedia.org/wiki/Amica_Mutual_Insurance#:~:text=Amica%20was%20founded%20in%201907,automobiles%20in%20the%20United%20States.

[3] https://www.amica.com/en/about-us/company-facts-and-history.html

[4] https://www.investopedia.com/amica-car-insurance-review-5076216

[5] https://mockaroo.com