

Project Dissertation Report

“Unleashed Human Resource Potential through AI capability framework”

Submitted By

**Kapil Sharma
2K21/DMBA/61**

Under the Guidance of

**Mr. Dhiraj Kumar Pal
Assistant Professor
DTU, Delhi**



DELHI SCHOOL OF MANAGEMENT

Delhi Technological University

Bawana Road Delhi 110042

CERTIFICATE

This is to certify that **Kapil Sharma, 2K21/DMBA/61** has submitted the major research report titled "**Unleashed Human Resource Potential through AI capability framework**" under the guidance of Mr. Dhiraj Kumar Pal as a part of Master of Business Administration (MBA) curriculum of Delhi School of Management, Delhi Technological University, New Delhi during the academic year 2022-23.



Signature of Guide
(Mr. Dhiraj Kumar Pal)

Signature of HOD
(Dr. Archana Singh)

Name of student: Kapil Sharma
Roll No.: 2K21/DMBA/61

DECLARATION

I, Kapil Sharma student of Delhi School of Management, Delhi Technological University hereby declare that the Report on "Unleashed Human Resource Potential through AI capability framework" submitted in partial fulfillment of the requirements for the award of the degree of Master of Business Administration (MBA) is the original work conducted by me. I also confirm that neither I nor any other person has submitted this project report to any other institution or university for any other degree or diploma. I further declare that the information collected from various sources has been duly acknowledged in this project.

Place: Delhi, India

Date: 17/04/2023

Kapil Sharma

(2K21/DMBA/61)

ACKNOWLEDGEMENT

This project would have been incomplete without mentioning the names of the people who have rightly guided. I consider it my privilege to express my gratitude and to all who have helped me in the success of the project.

I express my deep and sincere gratitude to **Mr. Dhiraj Kumar Pal, Professor, Delhi School of Management, DTU, Delhi**, a kind-hearted person who is a Role Model for all the youngsters, for providing the support and guidance for the successful completion.

I am grateful to our Head of the department **Dr. Archana Singh, Delhi School of Management, DTU, Delhi** for her able guidance, valuable suggestions, regular source of encouragement and assistance throughout my project work.

We are also indebted to our friends for their continued moral and material support throughout the course of the project.

Finally, My heartfelt thanks to the people who have contributed for the accomplishment of the project.

Kapil Sharma

Executive Summary

There are a lot of high expectations for artificial intelligence (AI), but what are businesses actually doing right now? This report's objective is to provide a practical standard against which businesses may evaluate their AI aspirations and initiatives. The study is grounded in fact rather than speculation and is based on a global survey of over 3,500 executives, managers, and analysts from a variety of businesses as well as in-depth interviews with over 38 technology leaders and experts.

Most businesses have a significant gap between aim and execution. Three-quarters of executives believe AI will allow their organizations to enter new markets. Almost 85% say AI will help their businesses get or maintain a competitive advantage. However, just around one in every five businesses has implemented AI in some of their products or operations. Only one out of every twenty businesses has extensively integrated AI into their offerings or procedures. Only 39% of all businesses have an AI strategy in place. Companies with at least 200,000 people are the most likely to have an AI strategy, yet just half have one. Our research finds significant differences between today's leaders — organizations that understand and have used AI — and laggards. Their approach to data is one significant distinction.

Algorithms used in AI are not inherently "intelligent." They do inductive learning by looking at the data. While the majority of industry leaders have strong information infrastructures and are investing in AI skills, other businesses lack analytical know-how and easy access to their data. Our research exposed a number of misconceptions regarding the tools required to teach AI. In addition to having a greater understanding of what it takes to produce AI than laggards, leaders are also more likely to have the support of senior leadership and have created a business case for AI efforts.

We discovered that these early adopters still believe in the benefits of cognitive technologies. The level of support for AI is simply astounding, just like it was in the previous survey. Three key conclusions emerged from our analysis:

1. Early adopters are increasing their investments in AI, starting additional initiatives, and seeing success. Cloud-based cognitive services are becoming more popular because they demand less capital and starting experience.
2. Businesses need to manage risk and change better. This involves controlling ethical concerns and mitigating cybersecurity vulnerabilities, which can sluggish or even halt AI operations. Additionally crucial are controlling return on investment and choosing the right projects.
3. Early adopters must have the correct mix of abilities, not simply technical ones, to advance quickly. In addition to needing corporate leaders who can choose the best use cases, they are short on AI researchers and programmers. They are teaching their current personnel to develop this expertise, yet many feel the need to replace existing employees

with new ones. Early adopters might also require a talent management strategy that automates what machines perform best while still utilizing human insight and originality.

ITs (information technologies) are now omnipresent in professional activities, disrupting and impacting all essential operations and processes. IT can have considerable consequences when incorporated into the business ecosystem, particularly in the way a firm interacts with its clients, partners, and potential clients. They also have a significant impact on how current operations and processes develop. The most stunning IT application today is still AI, a technology that has advanced inimitably over the past few decades.

These results demonstrate the allure of cognitive technologies, some of which are already being produced. The strongest returns from AI technologies, though, might come from businesses that manage their enthusiasm for the technology's potential with their capacity for action.

TABLE OF CONTENTS

Contents	Page No.
Company certificate	i
Certificate	ii
Declaration	iii
Acknowledgement	iv
Abstract	v
Table of Contents	vi
Lists of Figures	x
Lists of Abbreviations	xiii
CHAPTER ONE - INTRODUCTION	
1.1 Introduction	1
1.2 Project Title	1
1.3 Objective of Study	1
1.4 Need for Study	1
1.5 Scope of the Study	2
CHAPTER TWO – LITERATURE REVIEW	
2.1 Introduction to Artificial Intelligence(AI)	10
2.2 Artificial Intelligence and Business Activities	11
2.3 Working System	12
2.4 Characteristics of Artificial Intelligence in Business management	13
2.5 Objectives of Artificial Intelligence in Business management	14
2.6 Impact of AI an Organizations	15
2.7 Activities and Functions of AI in Business management	16
2.8 Benefits of AI in Business management	17
2.9 Challenges to AI in Business management	18
CHAPTER THREE - RESEARCH METHODOLOGY	
3.1 Research Methodology	20

3.2 Research Plan	20
3.3 Sampling Technique	21
3.4 Method of Data Collection	21
CHAPTER FOUR - AI @ Work	
4.1 Application Areas	28
4.2 Clustering or Segmentation	28
4.3 Psychographic Personas	32
CHAPTER FIVE - RECOMMENDATION	
5.1 Typical Recommendation Engine	35
CHAPTER SIX - ANALYTICS LANDSCAPE	
6.1 Application Areas	37
CHAPTER SEVEN - CONCLUSION	
7.1 Conclusions	40
References	42

Lists of Figures

Figure:3.1 Sample Framework

Figure:3.2 Impact of AI

Figure:3.3 Support System

Figure:3.4 Future Perspective

Figure:3.5 Investment vs. Returns

Figure:3.6 AI Landscape

Figure:3.7 AI Market Development

Figure:3.8 Cybersecurity

Figure 4.1: Previous Methodologies

Figure 5.1: Market Segmentation

Figure 5.2: Persona

Figure 5.3: Market Effectiveness

Figure 5.4: Neural Networks

Figure 5.5: Data Analysis

Figure 6.1: Market Interrelation

Figure 7.1: Value vs Complexities

Figure 7.2: Data Sensitivity vs Utility

Lists of Abbreviations

AI - Artificial Intelligence: The concept of a machine that can think for itself, make decisions depending on what inputs it is given.

ML - Machine Learning: one method for Artificial Intelligence to learn and adapt to human problems, such as image recognition, speech analysis and music creation.

BI - Business Intelligence: is what companies can use to analyze and predict market changes. **BIS - Business intelligence system:** a definition of a system that processes business intelligence.

BD - Big data: a buzzword for the data that is generated when companies conduct their business, a company's product is used, and more.

ETL - Extract, Transformation and Loading: the process of extracting data from a source, transforming it to follow a data standard, and then make it accessible through programs for managers.

DIC - Data inspection committee: The authority in Sweden, now known as Integrity

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Big data accessibility and the advent of the Internet of Things in the last ten years have elevated artificial intelligence (AI)-enabled technologies to the top of corporate organizations' priorities. In firms that embrace a data-centric and digital culture, AI has emerged as the main driver. According to the literature now in use in this regard, AI usage has increased by 70% over the past six years. According to International Data Corporation, global investment on artificial intelligence will rise from \$75.3 billion in 2021 to more than \$264 billion in 2025, with a 24.5% compound annual growth rate during that period.

1.2 Project Title

"Unlocking Human Resource Potential through AI capability framework".

1.3 Objective

The main goal of the study is to gain a deeper understanding of the meaning of "Artificial Intelligence" in the context of business, as well as its consequences and advantages. The report places a significant emphasis on the business. The Technology of the indicated company will be the study's main emphasis.

The major objective of the study was to identify the activities performed by various corporations, counted as technology oriented activities and how those activities were carried out. The following are the study's precise objectives:

- To create and grow practical and pragmatic AI capacity throughout your organization to obtain a long-term competitive edge.
- To avoid common AI and ML deployment errors by learning to anticipate and reduce strategic and operational obstacles and risks.
- To compete effectively with "born-digital" enterprises and shift to a more efficient, agile, creative, and inventive business strategy.
- To develop leaders that can assist you in making the best use of these technologies and adding value to your organization.
- To study the AI implementation plan, a final faculty debrief will provide insights on AI initiatives that are likely to succeed or fail.

1.4 Need for Study

- Artificial Intelligence manages the understanding and implementation of business forms both within and between enterprises.
- You will be equipped to cope with complicated commercial challenges linked to the transfer of supplier to the final customer if you have Artificial Intelligence in Business Management.
- Understanding of the methods required to manage and improve the interplay between configuration, assets, procedures, and client requirements.

1.5 Scope of the Study

Artificial Intelligence in Business management concerned with creating, aligning, and managing the inter-organizational present string, which is thought of as the competitive enterprise. This includes central integration within each and every single organization that is a member of the established present string.

- Understand the influence businesses have on society, the economy, the environment, and the necessity to create moral and ethical management procedures.
- Knowing how linked and worldwide business is will help you treat all of an enterprise's stakeholders with cultural sensitivity.
- Reflective practice has helped you define and realize your personal career goals.
- Analyze the foundation of an enterprise's value development processes and how the external environment affects value creation.
- Analyze the manager's responsibility for ensuring that a company generates long-term value in the context of changing internal and external contexts.
- Exhibit the capacity for strategic thought and the exploration of viable fixes for difficult and unclear issues.
- In a practical setting, research, critically assess, and apply a variety of sector- and role-specific theories and concepts.
- Create alternative solutions for difficult, unclear challenges while recognising the risks and assessing the possible outcomes.
- Launch and oversee a change management project that is tailored to a specific industry or job.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction to Artificial Intelligence

An integrated system capable of project management without human involvement is what is referred to as artificial intelligence (AI). Utilizing AI's potential mean automating tasks; rather, it means drawing conclusions from a variety of data points and using those conclusions to advocate processes, make project-related decisions, and provide team insights. As technology develops, for instance, there will surely be particular technologies capable of matching.

AI is also helpful in gathering workplace behavioral reactions and centralizing employee information.

Development of a knowledge management ecosystem:

- In order to increase quality and consistency, AI also utilized in project management to collect a variety of workplace behavioral patterns and to support knowledge centralization among employees. AI can help stop something from being reinvented when changes are foreseen. Even though this is primarily theoretical, this function would eventually be accessible and affordable for corporate organizations.

Create a secure environment:

- For projects that involve varying labor conditions, the use of AI aids in detecting hidden warning indicators of the possibility of accidents during project execution. In construction project management.

Providing unwavering objectivity and alertness

- While project managers may spend a lot of time establishing quality and accuracy targets, AI systems will not become exhausted, or complacent while finishing the project. Finding a system with all of the qualities is uncommon. On the other hand, project managers can gain from using AI via development.

2.2 Artificial Intelligence and Business Activities:

Artificial Intelligence in Business management the collaboration of different channel participants to plan, implement, and handle picture-perfect value that adds to the process of satisfying the needs of the target market. In the past ten years, Artificial Intelligence in Business management has grown in importance for every firm. Individual businesses and organizations must now build supply chains and networks of other businesses with intricate interrelationships in order to ensure. This means that they can no longer compete as independent, autonomous entities.

Distribution network administration is the term used to describe managing various connections via the inventory network (Artificial Intelligence in Business management).

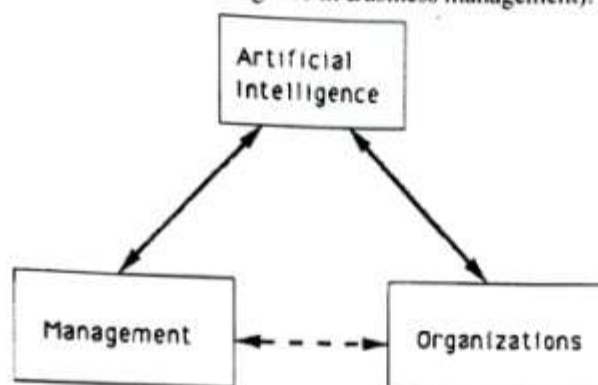


Figure:3.1 Sample Framework

Artificial Intelligence in Business management in a business is referred to as logistics; it further captures the functions of logistics as well as interactions with other company functions like marketing, operations, finance, etc., and with external enterprises.

IBM, for example, provides Watson, an AI computer software meant to answer natural language inquiries in a number of world activities (law, and healthcare).

2.3 Working System

A group of software programmes, is created to efficiently and dependably manage the whole distribution network. It serves as a dependable emotional support system to help the field employees and control room staff manage and monitor the electric distribution infrastructure. Bundling, stock management, warehousing, logistics, and other processes are all included in the phrase "dispersion management," which covers a extended range of practices. Coordinate the development of the product with the offer's incentive from the supplier or creator. The effective management of the entire allocation system is crucial to the budget's success as well as the breadth of corporate life.

The higher an organization or the more conspicuous the amount of supply centers an association has, the more it ought to rely on robotization to feasibly manage the dispersal process.

2.4 Characteristics of Artificial Intelligence in Business management

Integrated behavior: Artificial Intelligence in Business management incorporates integration of stakeholders from suppliers to customers.

Mutually sharing information: For compelling Artificial Intelligence in Business management commonly sharing data among channel individuals is required, particularly to plan and checking forms.

Mutually sharing channel risks and rewards: Effective Artificial Intelligence in Business management likewise requires common sharing channel hazard and remunerations that yield an upper hand. Hazard and remunerate sharing ought to happen over the long haul. Hazard and remunerate sharing is a vital enemy long haul center and collaboration among the inventory network individuals.

Co-operation: Cooperation among the channel individuals is required adversary powerful Artificial Intelligence in Business management. Co-operation implies comparable or reciprocal facilitated activities performed by firms in a company relationship to deliver predominant shared results that are regularly expected after some time.

Focus on serving customers: Supply system succeeds if each individual from the production group has the same intention and the same core of serving customers. Building up the similar objective and the comparable core among supply or store network individuals is a kind of approach reconciliation.

Integration of processes: The usage of Artificial Intelligence in Business management needs the coordination of procedures as of sourcing, to assembling as well as dissemination over the inventory network. The reconciliation can be proficient through diverse groups, in plant supplier faculty and outsider administration suppliers.

Maintain long-term relationship: Fruitful relationship plan to coordinate channel strategy to evade excess and envelope whereas looking for a level of co-operation that permits members to be more viable at lower cost levels. Approach coordination is possible if there are flawless social orders and organization frameworks among the chain people.

2.5 Objectives of Artificial Intelligence in Business management

Service orientation:

Inventory networks' core idea has always been to prioritize client management. Administration is all about the value that the client receives, thus it depends on his own judgment of what "esteem" is.

System orientation:

The establishment of the framework is the foundation of any store network's existence. Collaboration is vital to a shop network's growth due to involvement and coordination. This

means that even if the retail network as a whole delivers optimal results, these may not always be completely optimal for the chain's partners. However, there are substantial benefits for each and every cooperating party.

Improving value:

Each store network aims to increase the created common value. The evaluation of the retail network distinguishes between the prior item that the client finds valuable and the effort the production network makes to satisfy the client's request.

Improving quality:

Proficient production network helps in enhancing the nature of operations of the associations. Productive inventory network helps in extension of width and profundity of conveyance.

Competitiveness and Efficiency:

A corporate organization is the inventory network. It is focused on providing the client with quality. For it to effectively manage itself and be able to provide clients with services of increasing quality, intensity is essential. Competence is a key element of aggression.

Other similar objectives:

- To minimize the total system cost.
- To fulfill customer requirements through efficient resources.
- To face global competition.
- To improve standardization.
- To achieve world class performance.
- To reduce transportation cost.
- To maximize efficiency of the distribution side.
- To make better decisions.

2.6 Impact of AI on Organizations

Functional Changes:

It has been discussed that changes in knowledge ownership and control may result in market shifts within an organization. It removed the requirement for some on-site servicing by technical professionals by enabling clerical staff to help users over the phone. The system's implementation showed that technicians wasted time thinking inefficiently and that clerks only with the system solved more issues than technicians without it.

Marketing and sales

- Unified and more accurate price and demand forecasts enabled by AI
- Increased transparency and granularity on integrated margin by sale

Procurement

- Full data integration with suppliers
- Optimization of raw materials recipes based on forecasted prices

Planning

- Full transparency on execution through end-to-end digital control tower
- Risk-adjusted end-to-end margin optimization

Logistics and distribution

- Dynamic optimization of routing, freight contracting, and vessel sharing, reducing costs and environmental impact

Production

- Agile production planning and scheduling

Figure:3.2 Impact of AI

Support

AI benefits the workforce by streamlining some challenging job processes, which helps with time savings and helps with performance evaluation.

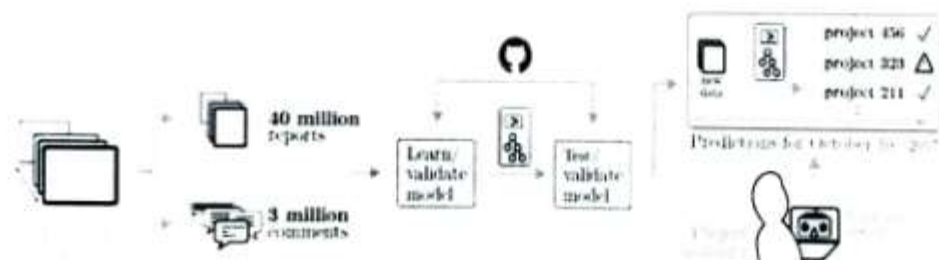


Figure:3.3 Support System

Accuracy

Project management data entry is reputedly inconsistent. Some workers could be extremely careful to the point of providing minute data about jobs and times, but others might not be. On the basis of the facts at hand, AI offers improved help in this area while empowering individuals to provide more precise results.

Insight and strategy

With regards to automation, number crunching, and associated routine jobs, digital technology is more independent.

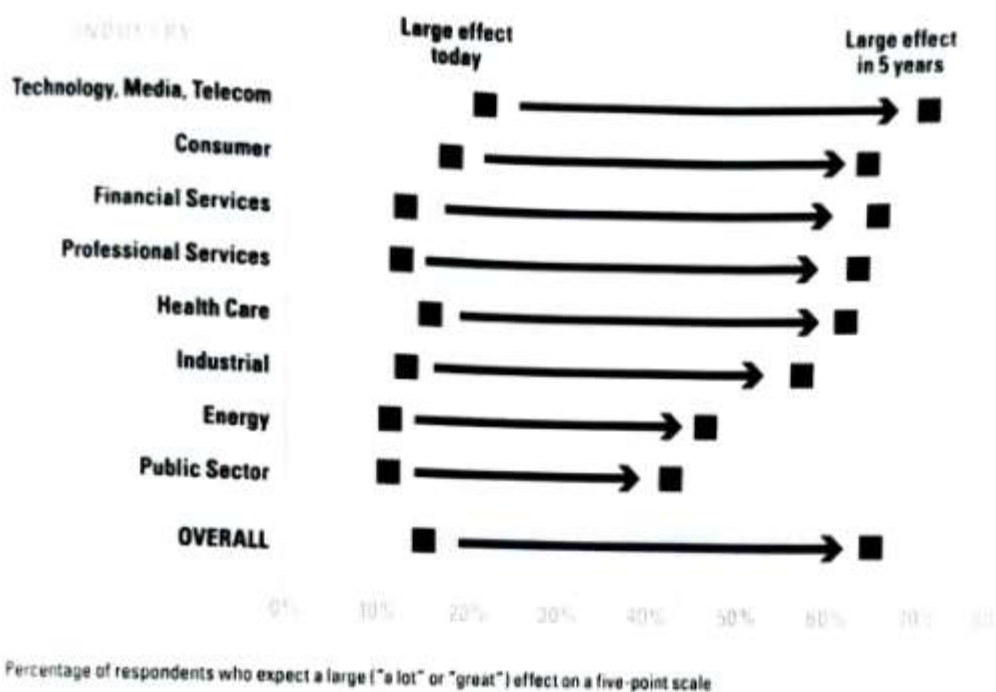


Figure 3.4 Future Perspective

2.7 Activities and Functions Of Artificial Intelligence in Business management

Activities related to logistics affect both the supply and distribution channels and are connected to the other tasks and operations that make up each firm as a whole. Key activities and support activities make up the logistics tasks included in Artificial Intelligence in Business management.

Key Activities:

- Management of Inventory,
- Service,
- Flow of Information, and
- Management of order.

Extended Activities of the Artificial Intelligence in Business management include

- Purchasing,
- Technologies,
- Management of production, and
- Information systems.

Extended activities are equally vital and help a business achieve its aims and objectives, but they might vary amongst firms depending on the sector in which they operate, the unique qualities of the goods and services they offer, and the demands of their customers.

The main functions of Artificial Intelligence in Business management includes

- Defining geographical boundaries business and relationships
- Production and distribution system interface

2.8 Benefits of Artificial Intelligence in Business management

- Enhanced customer service
- Provides High income
- Increased productivity and performance.



Figure:3.5 Investment vs. Returns

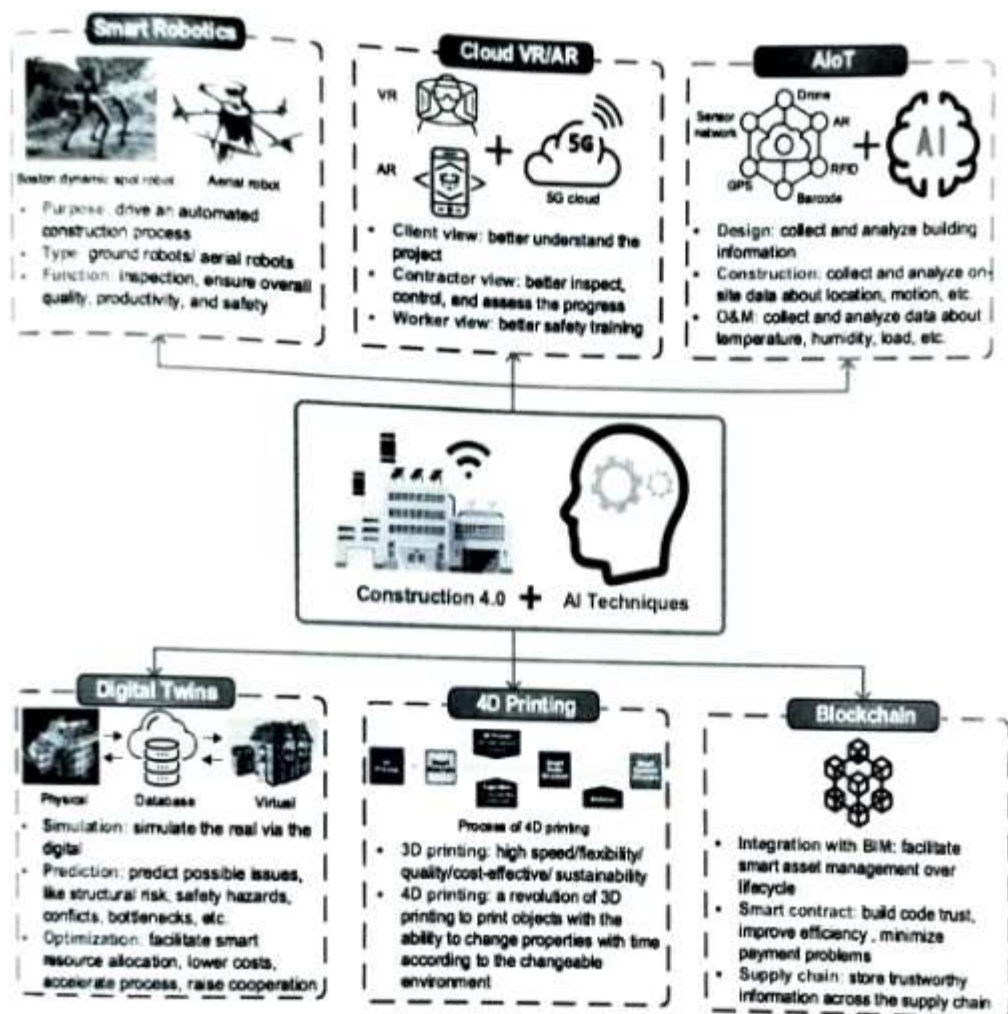


Figure 3.6 AI Landscape

2.10 Challenges In Artificial Intelligence in Business management

Globalization

One of the best inconveniences is that affiliations are going up against the technique through the lessen the cost of the stores framework. With the view to fulfill the wants of the targeted customers and earn effectively.

Client's preference

Overall supply chains are mind-boggling, as stated above. The test is impressively more important when you consider the always evolving incorporates. Customers quickly weigh associations to consider the accompanying enormous thing after a product is released.

Market Development

The trip for new clients is yet another section that displays a test. The cost of enhancing a product, from R&D through product presentation, is crucial. Similar to this, affiliations are working to expand their means of production in order to create wages and enhance a portion of the overall business. It is expected of associations to grow in their internal and external business sectors.

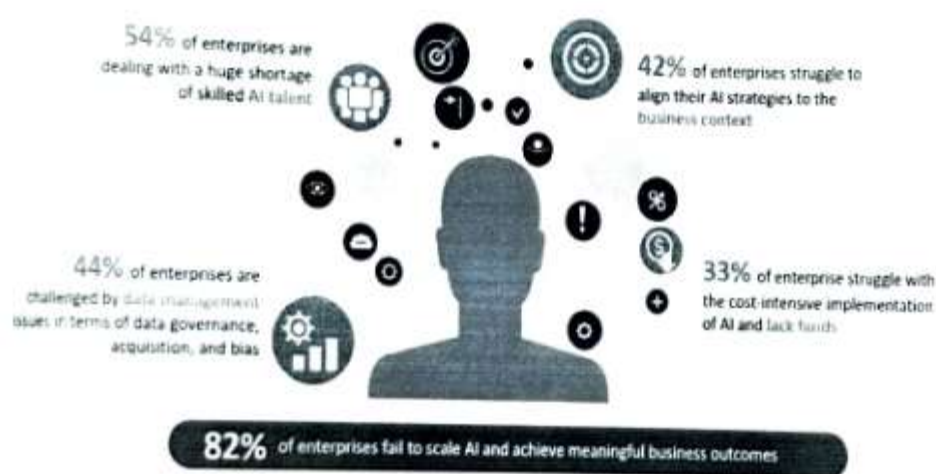


Figure:3.7 AI Market Development

Cybersecurity

Regular reviews and overhauls are needed if the overall goal is to remain as beneficial and practical as is logically necessary.

Cybersecurity threats are giving some companies pause

Effect of cybersecurity concerns on companies

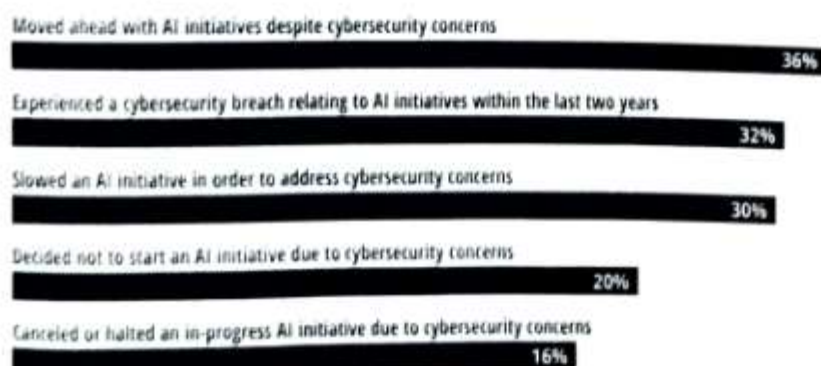


Figure:3.8 Cybersecurity

Managing inventory

Checking the number of carton boxes in your distribution focus is only one aspect of managing stock. It includes keeping enough stock on hand so your business may be adaptable and satisfy all client and customer demands. Additionally, solicitations must be timed correctly to guarantee that all items—or portions of items—arrive at the designated location and time without causing your company to experience severe delays. This also involves transferring enough stock to prevent your organization from running out—thus, affecting less stock.

Managing suppliers

Supervising suppliers follows closely after managing inventory. Stock system chiefs are in charge of understanding when they need several suppliers for a single item, managing suppliers when there are delays, and making sure that all solicitations adhere to quality standards. They are also in charge of locating reliable suppliers who offer their goods and services at prices that don't undermine your primary objective.

Maintaining Safety and Quality

Stresses over products that are created in many nations (or contain parts from various countries) yet may not adhere to authoritative rules can help to further the globalization of your retail system. Associations are now at risk of audits as a result. This means that managers of retail systems are in charge of making sure suppliers and their products maintain high standards of safety and quality. The reputation of an association might be damaged by audits or health difficulties, which can affect things like capital.

Risk Mitigation

Store system chairmen are responsible for making sure that problems with a supplier don't endanger their association. Associations that depend too heavily on a single provider are at risk if that supplier is unable to supply demand. That indicates store system management must reduce risks.

CHAPTER THREE

RESEARCH METHODOLOGY

The study uses information gathered from both primary as well as secondary sources. The respondents were surveyed for the primary data, and websites, newspapers, magazines, books, and journals were used to gather the secondary data. After data collection was complete, the filled-out questionnaires were correctly revised to make them suitable for coding.

Case studies (both single and multiple case studies) and empirical studies are the two main research methods. The majority of case studies focus on successful applications; however, there are few studies that examine failures, which may be even more crucial to examine than successes. Case studies offer both useful information and a foundation for creating theories that will eventually be put to the test via empirical techniques.

3.1 Research Methodology

The explanation of research technique will take place in the context of research design, sample, data collecting, data sources, and tool descriptions.

Authors	Year	Methodology	Results
Borges et al.	2020	Searching for peer-reviewed and conference papers in 2 databases using keywords regarding Artificial Intelligence, Machine Learning, Business strategy and Information Technology strategy	Results were analyzed based on 4 perspectives: automation, decision-making, customer engagement and new products and services offering.
Camer and Blatti	2020	Searching for peer-reviewed papers in 7 databases using the keyword "Artificial Intelligence" in business management field and social sciences/Papers published between 2015 and 2019	A conceptual framework was developed in order to define AI business strategy and discussed about abilities and limitations of AI, economics and AI, business functions and AI, workforce, industries and AI and regulations and ethics of AI.
Trank et al.	2020	Searching for peer-reviewed papers in 4 databases using keywords regarding Artificial Intelligence, Machine Learning and Decision-Making/Papers published between 2016 and 2019	A conceptual framework was developed in order to define how humans can use AI for decision-making under uncertainty.

Figure 4.1: Previous Methodologies

3.2 Research Plan

The fundamental strategy is what directs the researcher while they carry out their study activity. This study issue falls under the category of descriptive research, which is intended to characterize the current condition or the characteristics of a group, community, or product users.

It is believed that the study is best suited for a descriptive research design. The primary objective of utilizing this strategy is to describe the existing situation.

3.3 Sampling Technique

Random sampling was utilized as a part of the test size of the study.

3.4 Method of Data Collection

The data collection is divided into two categories:

Initial Data: The process of acquiring the precise information needed for the research is referred to as gathering primary data.

The managerial level and employees of Digitem Technologies pvt. Ltd. are surveyed to gather the simple data.

Subsidiary Data: The data acquired from the most recent source makes up the secondary information. The secondary data was gathered from related books, publications, websites, and articles. The supplemental information is used in place of the mandatory data.

3.3 Collaborative filtering recommender in Python

It is simplest to concentrate on Netflix, whose cutting-edge suggestion engine keeps people glued to the screens of our LCD TVs for hours, in order to comprehend the power of systems of suggestion. But recommenders come in many shapes and sizes, helping businesses cross-sell items, uncover applicants for jobs with comparable skill sets, and locate clients who would be receptive to advertising. And these are only a few instances of the many applications for recommendation systems.

There are two straightforward methods that serve as a decent place to start, despite the fact that recommendations might be highly complicated.

- A filtering system based on content suggests products that are comparable to those that an individual has enjoyed in the past or interacted with using item characteristics. The music genome project at Pandora analyzes each song's musical characteristics to discover related tracks and provide recommendations.
- By looking at how similarly people have rated each item, collaborative filtering can determine what products a user would enjoy. Netflix determines what material comparable users have seen in order to determine which series and movies viewers would appreciate.

With the use of sales transaction data made available by the online retailer Flipkart, this post will concentrate on creating a collaborative filtering suggestion mechanism.

Getting Started

We will make use of *Unexpected*, a Python scikit programme designed for collaborative filtering, to construct the recommender.

The dataset and the necessary software must be loaded first. The dataset consists of 8 tables, however I've previously connected tables and extracted the necessary columns for this presentation.

```
#Import packages
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

from surprise import NormalPredictor, Reader, Dataset, accuracy, SVD,
SVDpp, KNNBasic, CoClustering, SlopeOne

from surprise.model_selection import cross_validate, KFold,
GridSearchCV, train_test_split

#import dataset
olist_data = pd.read_csv('olist_data.csv')
```

This dataset is not well suited for building a collaborative ranking system, as is frequently the case with real-world data. Since approximately 90% of users are first-time buyers, we have a significant issue in identifying the things that they prefer because we lack their prior evaluations. Instead, we will divide the dataset between repeat and first-time users and feed the shared filtering approach with just the repeat consumers. We can still offer suggestions to first-time users, but they tend to be more broad and centred on item appeal and the user's current location.

```
def repeat_and_first_time(data):
    repeaters = data.groupby('customer_unique_id').filter(lambda x:
len(x) > 1)
    first_timers = data.groupby('customer_unique_id').filter(lambda x:
len(x) == 1)

    return repeaters, first_timers
```

Using Surprise

We will need to provide a dataframe with user id columns, a good id row, and a score column in order to take advantage of the built-in user-ratings vector conversion that surprise has available.

We will make use of `Unexpected`, a Python scikit programme designed for collaborative filtering, to construct the recommender.

The dataset and the necessary software must be loaded first. The dataset consists of 8 tables, however I've previously connected tables and extracted the necessary columns for this presentation.

```
#Import packages
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

from surprise import NormalPredictor, Reader, Dataset, accuracy, SVD,
SVDpp, KNNBasic, CoClustering, SlopeOne

from surprise.model_selection import cross_validate, KFold,
GridSearchCV, train_test_split

#import dataset
olist_data = pd.read_csv('olist_data.csv')
```

This dataset is not well suited for building a collaborative ranking system, as is frequently the case with real-world data. Since approximately 90% of users are first-time buyers, we have a significant issue in identifying the things that they prefer because we lack their prior evaluations. Instead, we will divide the dataset between repeat and first-time users and feed the shared filtering approach with just the repeat consumers. We can still offer suggestions to first-time users, but they tend to be more broad and centred on item appeal and the user's current location.

```
def repeat_and_first_time(data):
    repeaters = data.groupby('customer_unique_id').filter(lambda x:
len(x) > 1)
    first_timers = data.groupby('customer_unique_id').filter(lambda x:
len(x) == 1)

    return repeaters, first_timers
```

Using Surprise

We will need to provide a dataframe with user id columns, a good id row, and a score column in order to take advantage of the built-in user-ratings vector conversion that surprise has available.


```
def create_user_ratings_df(data):
    df = data.groupby(['customer_unique_id', 'product_id'])
    ['review_score'].agg(['mean']).reset_index()

    df = df.rename({'mean': 'estimator', 'product_id': 'productId'},
axis=1)
    return df

user_ratings_df = create_user_ratings_df(repeater_data)
user_ratings_df.head()
```

	customer_unique_id	productId	estimator
0	00053a61a98854899e70ed204dd4baf	58727e154e8e85d84052cd22b0136c84	1.0
1	00053a61a98854899e70ed204dd4baf	62984ea1bba7fcea1f5b57084d3bf885	1.0
2	000bfa1d2f1a41876493be685390d6d3	bb15f9ba2ec6e36ab6c9e88d17430d64	4.5
3	000de6019bb59f34c099a907c151d855	9e572ff4654f7064419d97a891a8b0fc	2.0
4	000de6019bb59f34c099a907c151d855	af0a917aec9cea3b353ece61a8825326	2.0

Surprise will then assist us in creating a customer-ratings pyramid where each user ID represents a row while each item the business sells is a column. This will have the same result as making a pivot table in Pandas. We'll use an 80/20 partition to split up the information frame across both the train testing set.

```
def surprise_df(data):

    scale = (data.estimator.min(), data.estimator.max())
    reader = Reader(rating_scale=scale)

    df = Dataset.load_from_df(data[['customer_unique_id',
                                    'productId',
                                    'estimator']], reader)

    return df

user_ratings_matrix = surprise_df(user_ratings_df)
train_set, test_set = train_test_split(user_ratings_matrix,
test_size=0.2, random_state=19)
```

- There are 11 alternative techniques for forecasting offered by Surprise, including KNN variants and terrain-reduction methods like SVD and NMF. We will put a couple of the most popular methods to the test for this presentation.

- We will compare the outputs of the following models using a 5-fold validation.
- NormalPredictor is a basic model that forecasts a random rating using the test set's distribution, which is thought to have a normal distribution.
- SVD: an array compression method that Simon Funk made popular in recognition of the Hbo award.
- KNNBasic: uses user-specified distance metrics or cosine similarity to conduct KNN.
- CoClustering is an algorithm that, like k-means, allocates points to clusters.

There are two utilises to evaluate the achievement of a model. When evaluating a user qualitatively, you may assess whether the advice makes sense in light of the other goods they enjoy. For instance, The Shining might be a better choice than Love Actually if the viewer prefers horror films to romantic comedy series. We only have merchandise id for every one in this dataset, thus we'll utilise the quantitative metric of root mean square error of the error. The best way is a mix of the two, although a quantitative measurement is far more practical in real-world manufacturing.

```

kf = KFold(n_splits=5, shuffle=True, random_state=19)

def model_framework(train_data):
    #store the rmse values for each fold in the k-fold loop
    normp_rmse, svd_rmse, knn_rmse, co_rmse, slope_rmse = [],[],[],
    [],[]

    for trainset, testset in kf.split(train_data):

        #baseline
        normp = NormalPredictor()
        normp.fit(trainset)
        normp_pred = normp.test(testset)
        normp_rmse.append(accuracy.rmse(normp_pred,verbose=False))

        #svd
        svd = SVD(n_factors=30, n_epochs=50,biased=True, lr_all=0.005,
        reg_all=0.4, verbose=False)
        svd.fit(trainset)
        svd_pred = svd.test(testset)
        svd_rmse.append(accuracy.rmse(svd_pred,verbose=False))

```

```

knn = KNNBasic(k=40,sim_options={'name': 'cosine',
'user_based': False}, verbose=False)
knn.fit(trainset)
knn_pred = knn.test(testset)
knn_rmse.append(accuracy.rmse(knn_pred,verbose=False))

#co_clustering
co = CoClustering(n_cltr_u=3,n_cltr_i=3,n_epochs=20)
co.fit(trainset)
co_pred = co.test(testset)
co_rmse.append(accuracy.rmse(co_pred,verbose=False))

mean_rmses = [np.mean(normp_rmse),
               np.mean(svd_rmse),
               np.mean(knn_rmse),
               np.mean(co_rmse),
               np.mean(slope_rmse)]

model_names = ['baseline','svd','knn','coclustering','slopeone']
compare_df = pd.DataFrame(mean_rmses, columns=['RMSE'],
index=model_names)

return compare_df

comparison_df = model_framework(train_set)
comparison_df.head()

```

Model Turning: Surprise's Grid Search

The unexpected package includes a GridSearchCV to complete option for parameter tuning. A dictionary of parameters will be given to GridSearchCV, and each combination of parameters will be computed and compared.

The result from that search informs us that the best score (lowest rmse) found was 1.27 and was generated using the following parameters: "n_factors": 25, "n_epochs": 50, "lr_all": 0.01, and "reg_all": 0.1.

```

def gridsearch(data, model, param_grid):
    param_grid = param_grid
    gs = GridSearchCV(model, param_grid, measures=['rmse'], cv=5)
    gs.fit(data)

    new_params = gs.best_params['rmse']
    best_score = gs.best_score['rmse']

    print("Best score:", best_score)
    print("Best params:", new_params)

    return new_params, best_score

svd_param_grid = {'n_factors': [25, 50, 100],
                  'n_epochs': [20, 30, 50],
                  'lr_all': [0.002, 0.005, 0.01],
                  'reg_all': [0.02, 0.1, 0.4]}

svd_params, svd_score = gridsearch(train_set, SVD, svd_param_grid)

```

Outcome

We subsequently execute the algorithm on the whole train set with crossover validation using the aforementioned settings to obtain proficiency scores over the test collection.

```

def final_model(train_set, test_set):
    params = {'n_factors': 10, 'n_epochs': 50, 'lr_all': 0.01,
              'reg_all': 0.1}

    svdpp = SVDpp(n_factors=params['n_factors'],
                  n_epochs=params['n_epochs'],
                  lr_all=params['lr_all'],
                  reg_all=params['reg_all'])
    svdpp.fit(train_set)

    predictions = svdpp.test(test_set)
    rmse = accuracy.rmse(predictions, verbose=False)

    return predictions, rmse

final_predictions, model_rmse = final_model(train_set, test_set)

```

The user id, item id, user real rating, model estimated rating, and indication that the prognosis was able to make are all outputted as predictions by the test attribute. We will examine the variance of the absolute errors across all forecasts in addition to the classifier_rmse output

generated by our final, trained model. To do that, we will gather the output of the guesses into a data set and include a column that lists each detection's inaccuracy. The findings will then be shown by creating an error histogram.

The dump module, a Pickle wrapper, may then be used to package the model. The team-based screening proposal in this illustration is only a portion of the whole system. It complements.

CHAPTER FOUR

AI @ Work

4.1 Application Areas

Customer relationship management (CRM):

You may focus on advertising efforts in the forms which are most inclined to be successful by utilising CRM software to group users into batches depending on their characteristics and where you are in their buying cycle using a mix of logistic regression and neural networks for clustering.

Detecting outliers and fraud:

Anomaly detection looks for things that stand out, while programmes hunt. Although it has long been used in financial services to identify fraud, the same statistical techniques are also beneficial in other fields, such as medical and pharmaceutical research.

Anticipating demand

Every firm faces the vital but difficult task of anticipating demand for new goods and services.

Improving processes

Forecasting may boost productivity for suppliers, utilities, and other businesses that rely on complicated and fragile gear by detecting which gadgets and parts are probably to require repair.

By analyzing past usage data and current sensor data, these models of prediction can improve performance, reduce downtime, and help prevent the types of large work disruptions that could occur when crucial systems fail suddenly.

Building recommendation engines

Streaming services, online shops, dating websites, and other businesses rely on personalized recommendations to promote customer interest and loyalty.

Improving time-to-hire and retention

Additionally, some departments use a combination of personality profiles and performance data to forecast upcoming conflicts or predict when employees are likely to leave so that they can be proactively resolved.

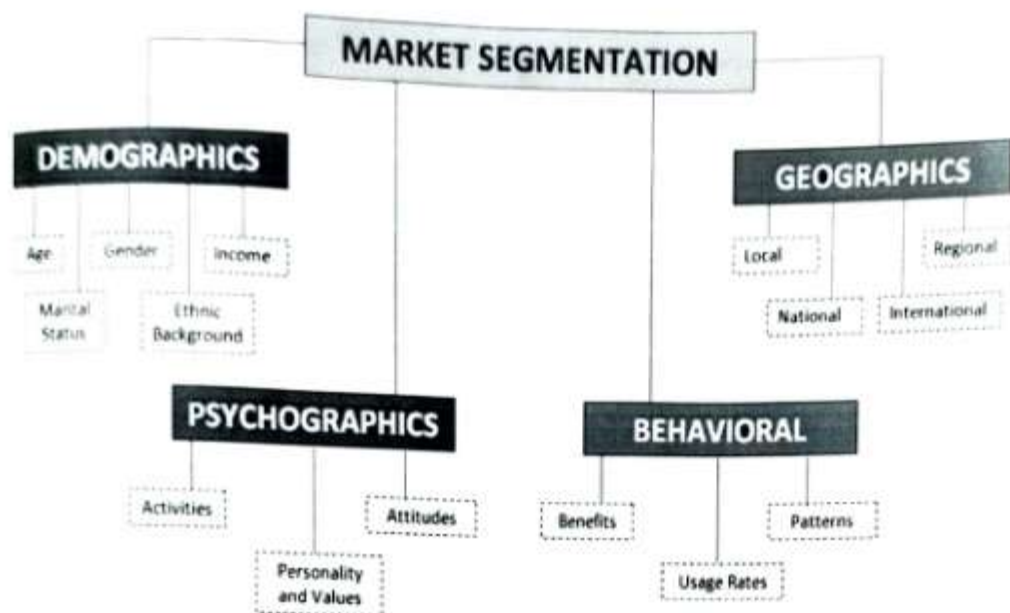


Figure 5.1: Market Segmentation

4.2 Clustering or Segmentation

There are various applications for customer segmentation or clustering. It might be applied to targeted advertising. Creating separate predictive models for each data cluster when creating a predictive model can sometimes be quite helpful.

Data structures can be found via cluster analysis without an explanation or perspective. Cluster analysis merely identifies patterns in the data without elucidating their causes. By themselves, the resulting clusters have no significance. To develop their identity, that is, to comprehend what they stand for and how they vary from the parent group, they need to be thoroughly characterized.

The creation of an ordered or tree-like structure throughout the clustering process makes it a hierarchical clustering technique.

- Each object begins fuzzy clustering in a single
- In contrast, with dividing clustering, all the items are first clustered into a single cluster before being split or divided into numerous clusters.
- A quasi clustering method called K-means clustering initially allocates or defines a cluster center before grouping all the items that fall within it.

Examining cluster centers is necessary for cluster interpretation and profile creation. One of my favorite methods is to randomly divide the data into two halves, cluster each half separately, and compare the cluster centroids between two sub-samples. The sequence of the cases in the data set may have an impact on the hierarchical clustering result.

In the end, grouping is a powerful technique for identifying structures and patterns in data, and it has a wide range of applications in analytics for business. There are several clustering strategies. A researcher should be familiar with the many clustering techniques and be able to select the one that best suits the demands of the organisation.

4.3 Psychographic Personas

Psychographics are markers of a person's preferences, actions, attitudes, and beliefs that assist in determining it.

Using psychographic segmentation, products can be built or positioned to stand out from the competition. Making perceptual maps enables you to position your brand for best benefit and gives you insight into how customers perceive your brand. Marketing professionals may better understand how different client categories may respond to a social post, billboard, or blog by using AI.

It can make suggestions for words and attitudes that most appeal to each audience segment by taking into account how customers converse with one another.

The technique of dividing a market in different segment of customers who are comparable to but distinct from customers is known as segmentation. A market is segmented into smaller categories. Selecting the most lucrative market segments is part of target marketing. Additionally, positioning is developing a product image that appeals to one or more target markets.

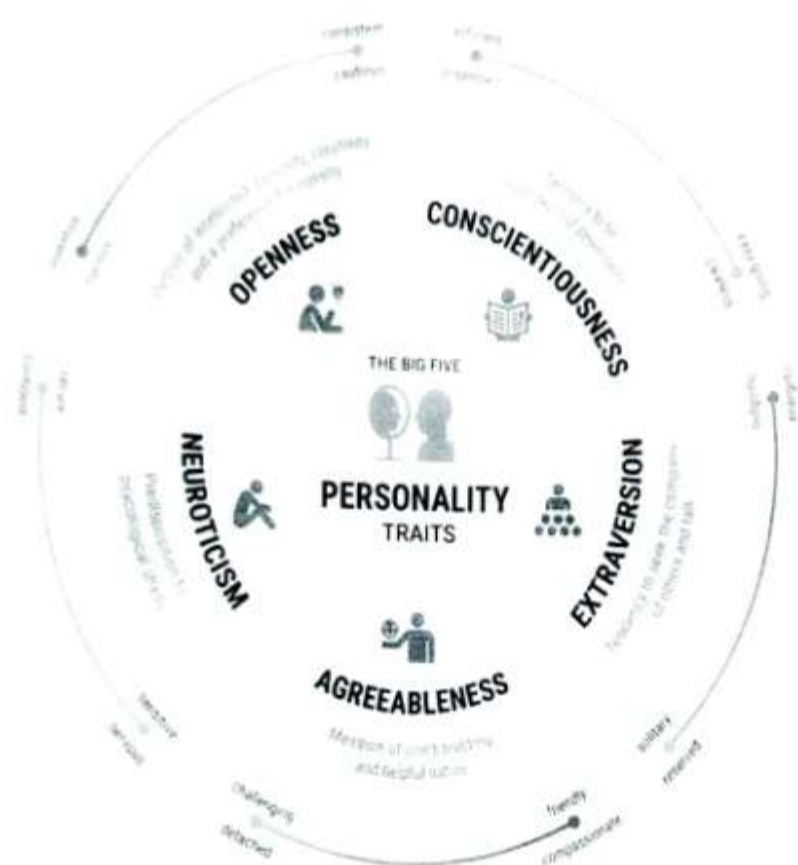


Figure 5.2: Persona

A persona's psychographic targeting criteria are determined by the psychological propensity of a set of individuals to act in a particular way or be drawn to comparable things. Therefore, one of the psychographic characteristics for a young mother would be an interest in learning more about the resources that might teach her how to take care of her child.

Indicators for determining a person's mentality in the online world can include past website behavior, browsing activity, past purchase history and other similar information. When psychological data is gathered and combined in this way, it can provide highly useful insight about the kinds of items that a person may be engaged in or competent to purchase.

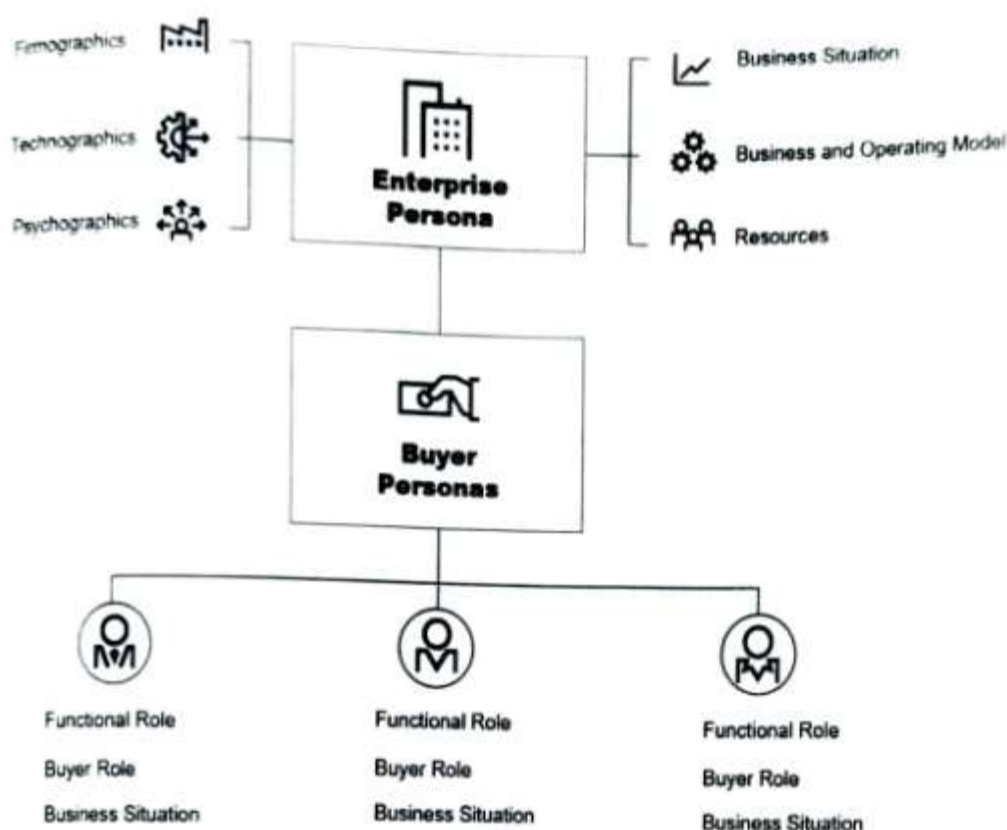


Figure 5.3: Market Effectiveness

Marketing professionals may better understand different client categories. It can make suggestions for words and attitudes that most appeal to each audience segment by taking into account how customers converse with one another.

4.4 Dimensionality Reduction

Systems can eliminate data that is useless for analysis with the aid of dimensionality reduction. These algorithms are employed to eliminate redundant data, outliers, and other useless data. Dimension reduction might be useful. Even just knowing that a sensor is on can result in hundreds of data points in IoT systems. That "on" data should not be stored or analyzed because it will take up valuable storage space. Additionally, a machine learning system's performance will increase by eliminating this redundant data. Finally, the proposed technique will aid analysts in making sense of the information.

4.5 Gradient Boosting

Data that has been wrongly identified by earlier trees is largely used to train future trees. Gradient boost can thus concentrate more on challenging instances and less on cases that are straightforward to anticipate.

An ensemble is just a group of predictors that averages out all previous forecasts to get a final prediction. We utilize ensembles because several predictors working to forecast the same target variable will be more effective than any one predictor working alone. The two subcategories of assembling methods are bagging and boosting.

4.6 Big Data Synthesis

The three main factors that can be taken into account while working with big data.

The goal of optimization is to use well-established processes and models to identify the problems that can be solved most successfully. Everyone approaches the optimization problem in one of two ways: directly (systematically) or indirectly (informally). The issues that require optimization include the issue of the traveling salesperson, choosing a course from among those offered at a certain level (undergraduate) and stream (let's say scientific stream).

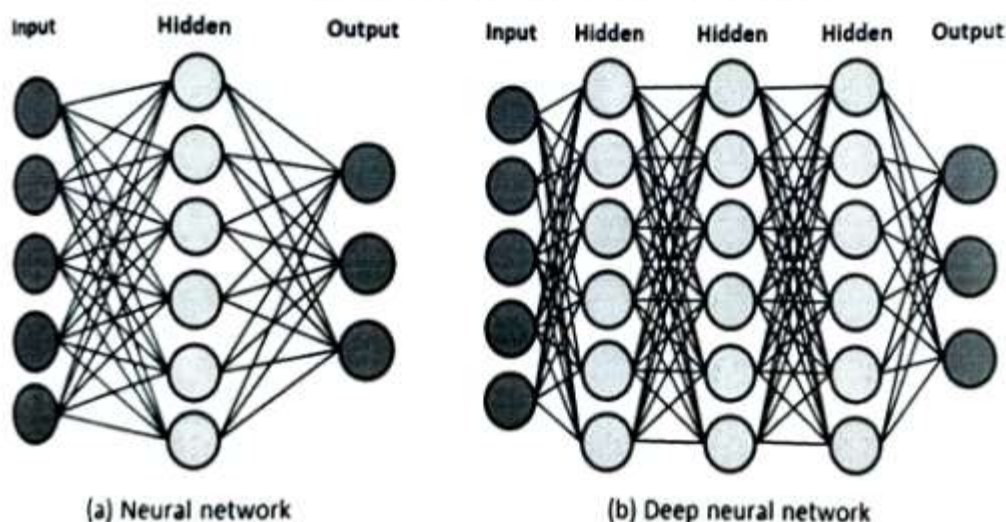
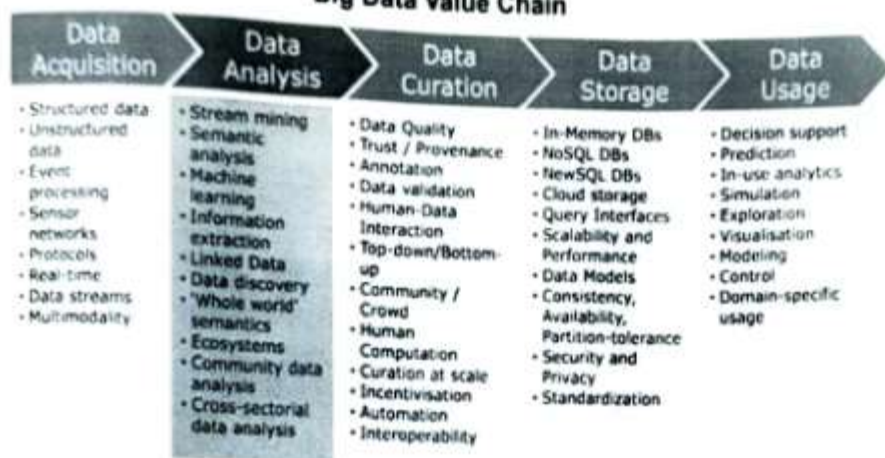


Figure 5.4: Neural Networks

Big Data Value Chain



Machine Learning

- Distinguish between spam and non-spam email messages
- Determine the best content for engaging prospective customers

Classification Tree Analysis

- Automatically assign documents to categories
- Categorize organisms into groupings
- Develop profiles of students who take online courses

Genetic Algorithms

- Schedule doctors for hospital emergency rooms
- Generate "artificially creative" content such as puns and jokes



Analyzing Big Data

Sentiment Analysis

- Improve service at a hotel chain by analyzing guest comments
- Determine what consumers really think based on opinions from social media

Regression Analysis

- Levels of customer satisfaction affect customer loyalty
- Number of support calls received may be influenced by the weather forecast given the previous day

Figure 5.5: Data Analysis

It can make suggestions for words and attitudes that most appeal to each audience segment by taking into account how customers converse with one another.

CHAPTER FIVE

RECOMMENDATION

5.1 Typical Recommendation Engine

At the moment the industries due to some not negligible causes have a downward slope. There are lots of issues to discuss that are responsible for, such as power crisis, water leakage, and finished goods stores. If we take a look at these issues we'll get to know how many problems occur in the absence of a power crisis. For example in the absence of power or electricity the manufacturing department of any company is severely affected.

5.1.1 Collection of Data

Since the user is currently utilizing the application, collecting this data requires no more user input. The drawback of this strategy is that it makes data analysis more difficult. Filtering the necessary logs from the unnecessary ones, for instance, might be time-consuming.

5.1.2 Storing the Data

The recommendations will be more accurate if you can give your algorithms access to additional data. This implies that any project including suggestions could easily transform.

5.1.3 Analyzing the Data

Essential or unique characteristics, material goods are called quality. In this competitive world every organization is trying to make their product finest (i.e. quality product). So for this purpose, there is a need for a quality control chamber (i.e. quality control process). Quality control is a practice that is used to make a certain level of quality (i.e. value) in a product. Usually, it includes systematically inspecting the quality of products. The simple objective of this practice is to make the products reliable, adequate, harmless and economically sufficient. Organizations that are more conscious with the quality of their products have a number of experts / experienced people for this purpose who observe the quality of goods. They arbitrarily select the products and examine them.

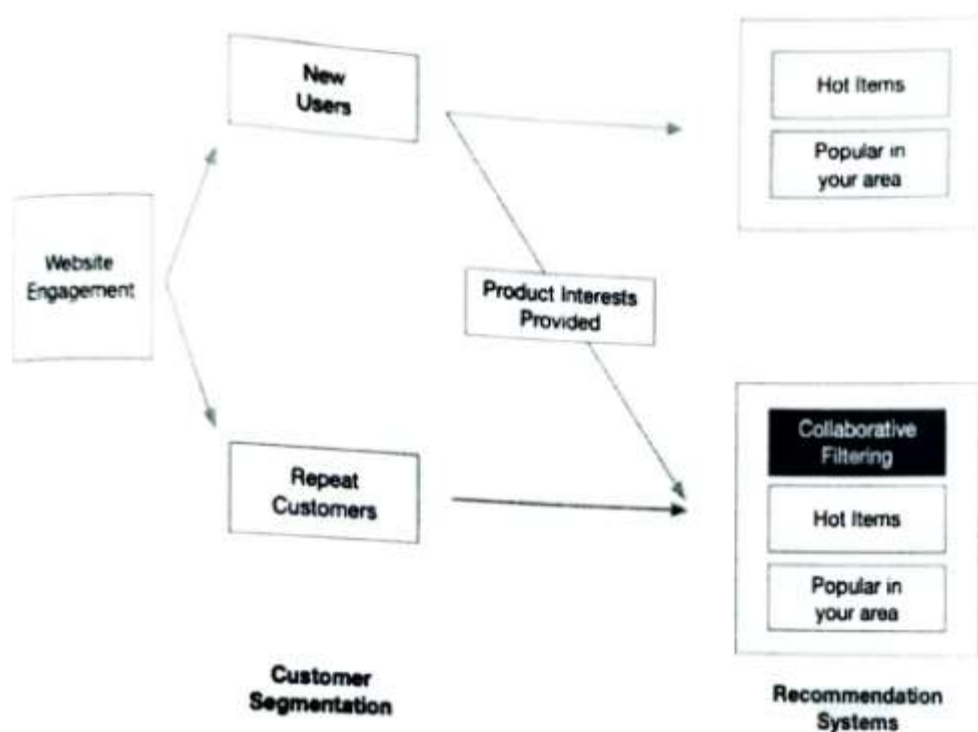


Figure 6.1: Market Interrelation

If they recognize under quality products that don't lie at the line of standard (i.e. benchmark) set by the company. It means there is some kind of detriment or flaw in that particular product, as an example the recognized organization (i.e. nestle) threw their entire cereal at one time when they found out that there are some iron particles mixed in the cereals.

CHAPTER SIX

ANALYTICS LANDSCAPE

Large amounts of new data will be made available right now as well as structured data from sensors and other sources. The abundance of data is the primary driver of the development of data-driven AI.



Descriptive

Gives an account of what has already occurred over the past days, months and years.



Real-time

Gives insight into up-to-the-minute data (requires sophisticated data management skills and processes).



Diagnostic

Looks at why something happened: What went wrong and what went right?



Predictive

Looks at what might happen in the future based on past results, driving future outcomes.



Prescriptive

Provides guidance on what to do next.

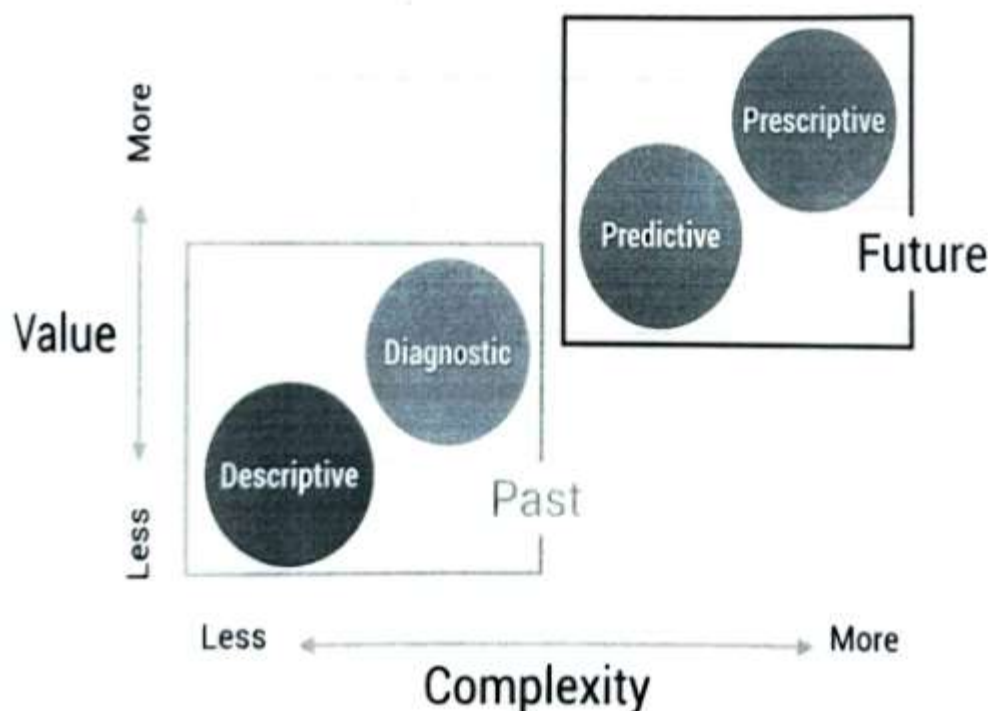


Figure 6.1: Value vs Complexities

6.1 Application Areas

Customer Analytics:

Applications for marketing, customer experience are included in this area. These technologies include VOCA (Voice-of-Customer-Analytics) and SNAzzy (Social Network Analysis in Telecom).

Supply Chain Analytics:

This entails risk mitigation, demand forecasting, inventory, pricing, scheduling, transportation, and storage optimization. The outcomes of IBM's internal procurement optimization are outstanding. Are under the purview of a subfield referred to As human Capital Analytics, also known as Workforce Analytics.

Deception and hazard analytics:

This covers assessing several risk categories, particularly in the banking sector (market, operational, and credit).

Analytics in General:

Authorities are employing analytics for jobs like identifying water leaks in distribution networks, making electricity grids and transportation systems smarter, and increasing public safety, driven by natural resource restrictions.

6.1 Complexity of Analytics

To get the optimal result, while predictive analytics is concerned with what will happen next.

Five essential aspects of client needs are the focus of business analytics:

Information access:

The first section serves as the basis for business analytics. In order for decision makers to be able to comprehend how their particular region of the business is performing and make educated judgments, it is essential to promote informed/collaborative decision making across the business.

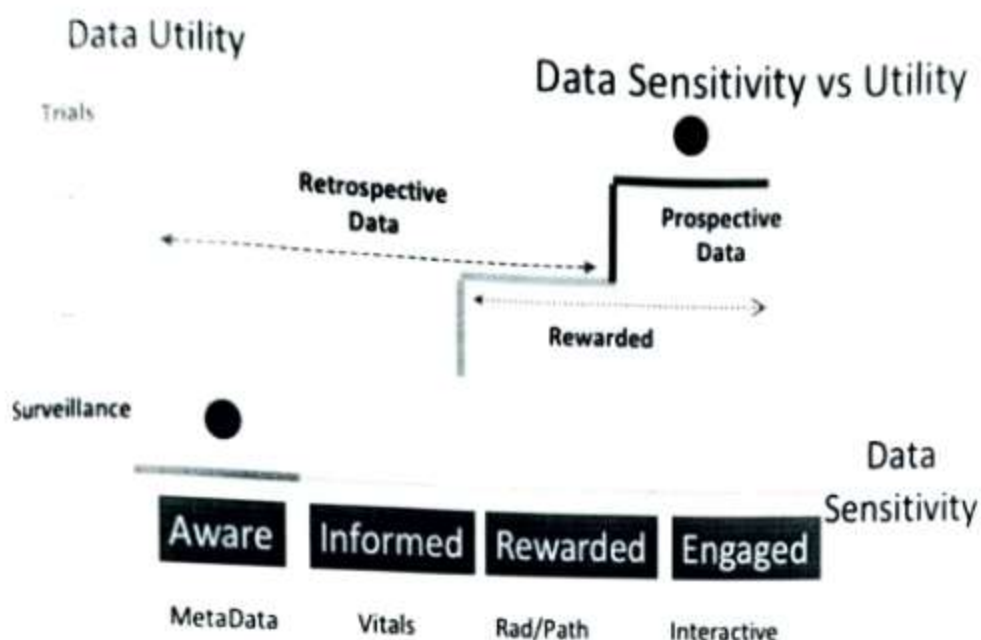


Figure 6.2: Data Sensitivity vs Utility

Insight:

This would entail developing a deeper knowledge of why things are happening.

Foresight:

Utilizing historical data to forecast likely future outcomes allows actions and decisions to be calculated to fit the goals and needs.

Business Flexibility:

Decision improvement of processes that are both automated and process/people-centric.

Strategic alignment:

This market segment focuses on coordinating every worker's strategic actions throughout the organization, from planning to execution. It has to do with making operational and commercial visibility possible. Decision-making criteria such as choices, targets, goals, and needs must be documented.

6.3 Findings

- The population of India is likely to rise from 121.1 crores in 2011 to 152.2 crores in 2036 – a 31.1 crore increase. The population will go up by 25.7 percent in 25 years, at the rate of one percent annually. Consequently, the density of population will rise from 368 to 463 persons per square kilometer.

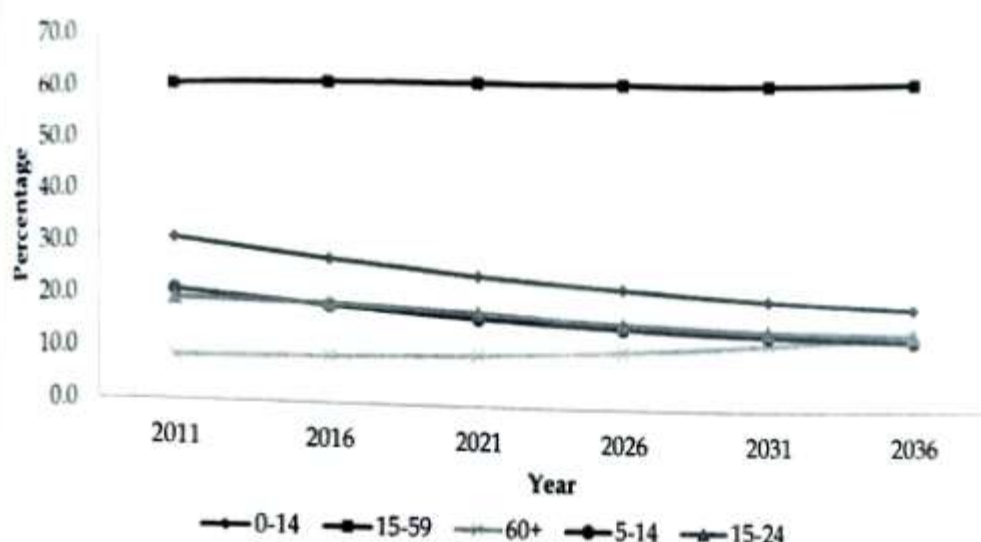


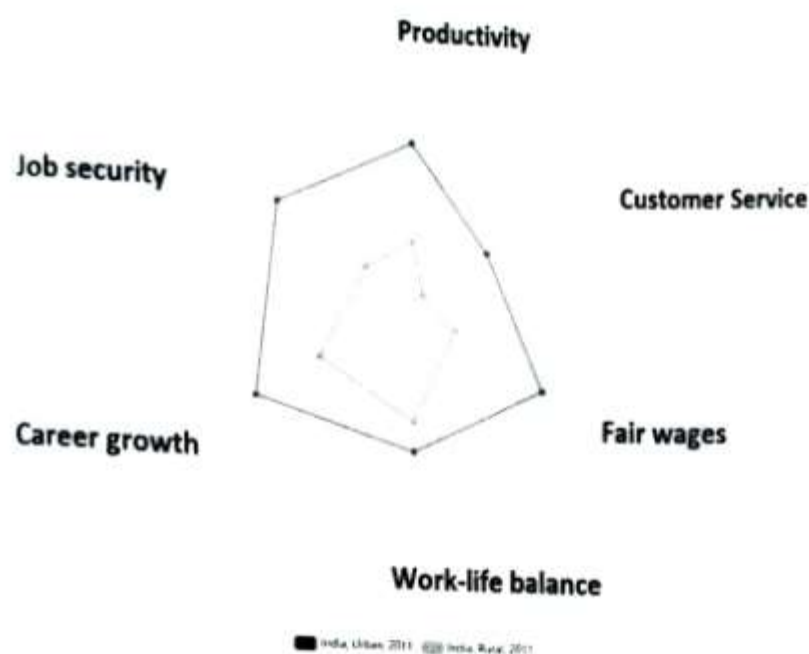
Figure 6.3: Percentage of population by broad age-groups, India 2011- 2036

- Unemployment Ratio: The percentage of unemployed people among those who are eligible for employment is referred to as the unemployment ratio.
- 6.6% of males and 9.4% of women were unemployed (compared to 9.3% and 11.6% in July-September 2021).
- Worker-Population Ratio (WPR): The WPR is the proportion of the population that is employed.
- In urban areas, the WPR for people 15 and older was 44.5% (down from 42.3% in July-September 2021).
- In comparison to 66.6% and 17.6% in 2021, the WPR for males was 68.6% and 19.7% for women.
- The labour force participation rate (LFPR), for those aged 15 years and over who live in urban areas, is the proportion of the population that is employed, actively looking for work, or otherwise available for employment.
- It grew to 47.9% from 46.9% during July and September of 2021.
- The LFPR for men was 73.4%, and for women it was 21.7% (compared to 73.5% and 19.9% from July to September 2021).



Figure 6.4: Number of workers by state

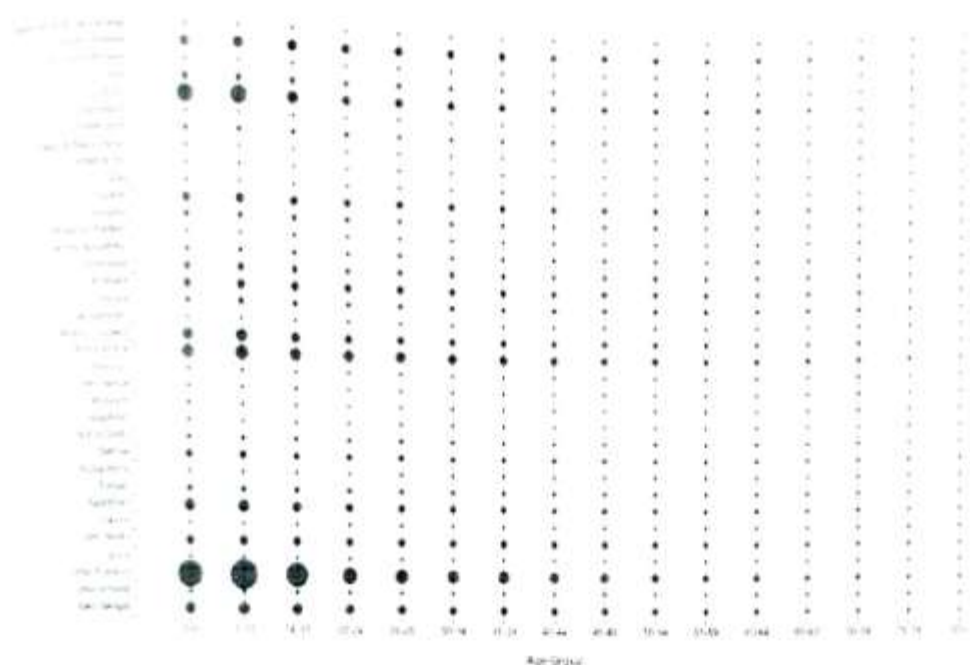
The population dynamics are influenced by a variety of factors, including food production and equitable distribution, climatic conditions, socio-cultural context, political and economic conditions, and a host of other factors. Determining fertility and mortality is not an easy task, especially when looking into the future. This makes it a very challenging exercise. Therefore, care must be taken while creating or using population forecasts in the context of the many constraints placed upon them.



Source: DRG, Population Census 2011, 2011, Table PC11, HL06 to PC11, HL07

Figure 6.5: Factors affecting corporate landscape

Statistically, AI systems can “predict” and “learn,” by plotting curves of possible outcomes and then optimizing decisions based on many criteria. So you could imagine an AI system that looks at all the possible demographics, job history, and interview questions with a candidate and then “predicts” how well they will perform on the job.



Source: CIPRA, Population Census 2011, Table PG-11, E23

Figure 6.6: State Wise analysis of Workforce participation

Using this gathered data AI programs can then rank candidates on a scale using various pieces of information such as experience, work history, skill sets, and salary expectations to find the right person. This method of processing data is becoming highly valued in today's market because of its ability to locate passive candidates, who are generally the most desired, as they aren't actively looking for other positions and they are content with their current position meaning they are an asset to their company which in turn means there is less competition to place them.

CHAPTER SEVEN

CONCLUSION

7.1 Recommendations

I came to the conclusion that Technological is a leading company. The market leaders are consumer goods and Technologies. It does not typically remain stationary at one location, despite its good operations. Even though it can be challenging to provide recommendations to a well-known organization, I make a humble effort to give some recommendations to this well performing organization.

- Automation of planning for material requirements and production needs.
- An extensive database of all suppliers, allowing the buyer to quickly access the supplier's information.
- Access to real-time update automation and online billing.
- Ensure all documents with accuracy.
- The organization must set up online duty payments based on bill of entry.
- Half-yearly implementation of the customer feedback form.
- Product HS code settlement.
- Training in IT, communication, leadership, and supply chain management.

7.2 Conclusions

Technology has advanced more quickly in every professional field, which has made life better for people in general. Technology advancement has aided in the growth of big data and data science, which use AI as their backbone. Artificial intelligence (AI) systems have been defined as tools that assist users in developing perceptions of their environment and exhibiting behaviors.

But project management is one area where AI is being used more and more. AI is aiding in managing multiple tasks simultaneously while utilizing the limited resources available in this area. The application of AI can increase environmental security.

Artificial Intelligence in Business management is increasingly understood to be the control of the major business operations that make up the supply chain. Artificial Intelligence in Business

management that is optimized can greatly improve stock availability and inventory turns while reducing total system cost, inventory, and cycle times. If these outcomes are achieved, businesses may gain increased earnings, better customer service, and a competitive edge. It has consistently benefited from the advantages of its excellent Artificial Intelligence in Business management Department. It provides unrivaled professionalism and experience in all Digitem Technologies.

According to EuropeanProgress.org, it might cost more than 200% of an employee's salary each year to replace them. Due to training/onboarding, reduced efficiency, inadequate recruitment, and worse employee morale, the real cost might even be higher. Losing one of your best staff members could spell the difference between your business's success and downfall. For this reason, hiring managers frequently set a high priority on minimising attrition and raising employee engagement. A churn study using data from sources like: can be utilised through HR analytics for enhanced retention.

REFERENCES

- Baert, P. (2004). Pragmatism as a philosophy of the social sciences. *European Journal of Social Theory*, 7(3), 355–369
- Hines, T. 2004. *Supply chain strategies: Customer driven and customer focused*. Oxford: Elsevier.
- Handfield, R. B., Nichols E. L. (1999): *Introduction to Supply Chain Management*. Prentice Hall, New Jersey.
- Kidd, A. (2013). The Definitions of 'Procurement' and 'Supply Chain Management'. CIPS Australasia .
- Lambert, Douglas M., Martha C.Cooper and Janus D. Pagh, "Supply Chain Management: Implementation Issues and Research Opportunities," *The International Journal of Logistics Management*, Vol. 9, No. 2 (1998), p. 1.
- Mentzer, J.T. et al. (2001). "Defining Supply Chain Management". *Journal of Business Logistics* 22 (2): 1–25. doi:10.1002/j.2158-1592.2001.tb00001.x.
- Paul A Myerson (Jun 3, 2015), *Introduction to Supply Chain and Logistics Management Made Easy: Methods and Applications for Planning, Operations, Integration, Control and Improvement, and Network Design*, Financial Times.
- Macbeth, D.K., Ferguson, N., Neil, G., 1992. Developing customer supplier relationships, First PSERG Conference, Glasgow.
- Michael B. Stroh, 2006, *A Practical Guide to Transportation and Logistics*, logistics network inc.
- Novack, Robert A. and Stephen W. Simco, "The Industrial Procurement Process: A Supply Chain Perspective," *Journal of Business Logistics*, Vol. 12, No. 1 (1991), p. 145.
- Simon Croom, Pietro Romano, MihalisGiannakis, 2000, ' Supply chain management: an analytical framework for critical literature review" , *European Journal of Purchasing & Supply Management* 6 (2000) 67-83.
- Chaudharygroup.com. 2022. *Chaudhary Group*. [online] Available at: <https://www.chaudharygroup.com/index.php/Digitem_Technologies-ip> [Accessed 12 July 2022].
- 996co.com. 2022. *C.G. Print and Technologies | New Delhi Companies Directory*. [online] Available at: <<https://www.996co.com/npl/company/177993>> [Accessed 20 July 2022].
- En.52wmb.com. 2022. *Digitem Technologies Technologies New Delhi Pvt Ltd. Import data And Contact-Great Export Import*. [online] Available at: <<https://en.52wmb.com/buyer/26016418>> [Accessed 22 July 2022].

REFERENCES

- Baert, P. (2004). Pragmatism as a philosophy of the social sciences. *European Journal of Social Theory*, 7(3), 355–369
- Hines, T. 2004. *Supply chain strategies: Customer driven and customer focused*. Oxford: Elsevier.
- Handfield, R. B., Nichols E. L. (1999): *Introduction to Supply Chain Management*. Prentice Hall, New Jersey.
- Kidd, A. (2013). The Definitions of 'Procurement' and 'Supply Chain Management'-. CIPS Australasia .
- Lambert, Douglas M., Martha C.Cooper and Janus D. Pagh, "Supply Chain Management: Implementation Issues and Research Opportunities," *The International Journal of Logistics Management*, Vol. 9, No. 2 (1998), p. 1.
- Mentzer, J.T. et al. (2001). "Defining Supply Chain Management". *Journal of Business Logistics* 22 (2): 1–25. doi:10.1002/j.2158-1592.2001.tb00001.x.
- Paul A Myerson (Jun 3, 2015), *Introduction to Supply Chain and Logistics Management Made Easy: Methods and Applications for Planning, Operations, Integration, Control and Improvement, and Network Design*, Financial Times.
- Macbeth, D.K., Ferguson, N., Neil, G., 1992. Developing customer supplier relationships, First PSERG Conference, Glasgow.
- Michael B. Stroh, 2006, *A Practical Guide to Transportation and Logistics*, logistics network inc.
- Novack, Robert A. and Stephen W. Simco, "The Industrial Procurement Process: A Supply Chain Perspective," *Journal of Business Logistics*, Vol. 12, No. 1 (1991), p. 145.
- Simon Croom, Pietro Romano, MihalisiGiannakis, 2000, ' Supply chain management: an analytical framework for critical literature review" , *European Journal of Purchasing & Supply Management* 6 (2000) 67-83.
- Chaudharygroup.com. 2022. *Chaudhary Group*. [online] Available at: <https://www.chaudharygroup.com/index.php/Digitem_Technologies-ip> [Accessed 12 July 2022].
- 996co.com. 2022. *C.G. Print and Technologies | New Delhi Companies Directory*. [online] Available at: <<https://www.996co.com/npl/company/177993>> [Accessed 20 July 2022].
- En.52wmb.com. 2022. *Digitem Technologies Technologies New Delhi Pvt Ltd. Import data And Contact-Great Export Import*. [online] Available at: <<https://en.52wmb.com/buyer/26016418>> [Accessed 22 July 2022].

PAPER NAME

2. Kapil Major research project.docx

WORD COUNT

6239 Words

CHARACTER COUNT

35865 Characters

PAGE COUNT

35 Pages

FILE SIZE

8.2MB

SUBMISSION DATE

Apr 19, 2023 7:42 PM GMT+5:30

REPORT DATE

Apr 19, 2023 7:43 PM GMT+5:30

● 2% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

- 1% Internet database
- 1% Publications database
- Crossref database
- Crossref Posted Content database
- 1% Submitted Works database

● Excluded from Similarity Report

- Bibliographic material
- Quoted material
- Cited material
- Small Matches (Less than 8 words)

2% Overall Similarity

Top sources found in the following databases:

- 1% Internet database
- Crossref database
- 1% Submitted Works database
- 1% Publications database
- Crossref Posted Content database

TOP SOURCES

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	Rajendra Akerkar, "Artificial Intelligence for Business", Springer Scienc...	<1%
	Crossref	
2	vital.seals.ac.za:8080	<1%
	Internet	
3	RMIT University on 2022-10-25	<1%
	Submitted works	
4	University of Hertfordshire on 2021-12-09	<1%
	Submitted works	
5	IUBH - Internationale Hochschule Bad Honnef-Bonn on 2022-06-15	<1%
	Submitted works	