



A Project Report on  
**Digital Marketing Analytics – Sales Forecasting**

Submitted in partial fulfilment for award of degree of

**PGDBM**  
**In Business Analytics**

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### **Candidate's Declaration**

I, Vijaykumar Gotakhindi hereby declare that I have completed the project work towards the PGDM in Business Analytics at, REVA University on the topic entitled Digital Marketing Analytics – Sales Forecasting under the supervision of Akula Phaneendra, Faculty. This report embodies the original work done by me in partial fulfilment of the requirements for the award of degree for the academic year 2020.

Place: Bengaluru

Date: 18/09/2020

Name of the Student:

Vijaykumar Gotakhindi



## Certificate

This is to Certify that the PROJECT work entitled Digital Marketing Analytics – Sales Forecasting carried out by Vijaykumar Gotakhindi with SRN R18DM015, is a bonafide student of REVA University, is submitting the project report in fulfilment for the award of PGDM in Business Analytics during the academic year 2020. The Project report has been tested for plagiarism, and has passed the plagiarism test with the similarity score less than 15%. The project report has been approved as it satisfies the academic requirements in respect of PROJECT work prescribed for the said Degree.

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Place: Bengaluru

Date:

## List of Abbreviations

Sl. No	Abbreviation	Long Form
1	LSTM	Long short-term Memory
2	ARIMA	Auto Regressive Integrated Moving Average
3	AI	Artificial Intelligence
4	ML	Machine Learning
5	POE	Paid Owned Earned

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## **Abstract**

The internet era has and will continue to change digital trends, which in turn directly affects consumer behavior and demands. The change in consumer behavior can be hard to understand or even recognize, but brands today need to realize that it is happening, and they need to change and adapt their customer service accordingly. The digital consumer has the potential to unsettle current competition as well as new players in any industry.

Consumers no longer trust traditional information channels as they once did, and so consumer opinion and relationships are formed on other, digital based, channels. This has meant a complete shift for brands to jump into digital and embrace conversation with consumers, which was previously reserved for personal comment and opinions.

As consumers needs changes, the companies must potentially predict and manage their digital strategies and consciously improve their campaigns based on the insights they are getting from digital metrics and forecast future sales.

Companies are now making their future investment or approach to market based on the forecasted numbers they have. These numbers will help management to decide on future course of actions, decide on promotional activities, marketing budget, product launch and many more strategies to improve company performance and survive in tough competition.

By developing the effective forecasting model, we can mitigate the future risks and convert them as opportunities for the business. The forecasted numbers will provide the guidance to all marketing and sales efforts and provide us the tremendous opportunity to improve digital platforms and advertising investments.

***Keywords: Consumer behavior, Forecasting models, Marketing strategies***

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## Chapter 1: Introduction

The business world has been evolving over the years. And marketing is not what it used to be. Today, it's a lot more advanced and targeted. Which means marketing, especially digital marketing, has become highly result oriented.

Regardless of what type of business it is, we need to understand that consumers no longer care about your generic approach. They want a personalized experience to the core. Which is why having access to the right kind of data is extremely important for marketers.

One of the biggest advantages of doing business in the digital era is having the ability to track and analyze your results with the help of digital analytics.

Digital marketing analytics measures, tracks and analyzes the campaign performance. It improves the management of digital marketing strategies. It is a continuous process of learning from digital data, it will help in reaching the business goals.

The digital data will provide marketer the ability dig more into what customers are looking for, how to engage, how to convert them as prospects and generate revenue for the business.

To transform digital data to actionable insights, marketers need to use right combination of tools available in the digital world. To track the effectiveness of a website and how it interconnects with other channels, following are the most popular metrics.

**Visits** – are the number of times people have visited our website

**Unique page views** – specified page or pages viewed once during the number of visits.

**Bounce rate**– the percentage of visitors to a website who navigate away from the site after viewing from the initial landing page.

**Pages per visit** – The number of pages a user viewed during a single session.

**Conversion** – when tracking a conversion, it is the number of times someone has acted on your page and is an important metric as it is the clear way to demonstrate the value of a marketing strategy.

The evolution of digital world created lot opportunities as well as tough competition, to overcome the fast-changing marketing strategies, companies are not investing more time and efforts on AI and Machine Learning techniques. Predictive analytics allow marketers to more concretely see what messages or content they should be creating in order to optimize their revenue potential.

Companies are not only analyzing the past data, but they are also concentrating more on forecasting their business on future. Forecasting sales or revenue projection is the foundation and compass for all the future marketing strategies.

For most the businesses, forecast can provide clarity on each channel's performance in digital marketing mix.



## **Chapter 2: Literature Review**

The internet continues to transform how we connect with others, share the information and organize the flow of things. With the fast-growing influence, it is now become essential part of our life. In 2019, the number of internet users worldwide stood at 4.13 billion, which means that more than half of the global population is currently connected to the world wide web.

People are now equipped with so much of information available in digital world, so their buying behavior has completely changed. Companies are now focusing much more on digital space rather than traditional marketing efforts.

Digital marketing refers to any marketing effort that involves the Internet or an electronic device. If marketing exists online, it's classified as digital marketing. That means social media marketing, content marketing, and SEO are all under the umbrella.

The rise of a lot of social platforms have seen their tremendous growth simply because they offer their content and services in vernacular. With a higher demand for vernacular content online, brands across segments will be forced to explore and deliver too if they want to see bigger growth.

Companies that implement a solid digital marketing strategy have a 2.8x higher revenue growth expectancy. In a nutshell, more digital marketing equals more money. Companies who focus on digital marketing also have a 3.3x better chance of expanding their workforce and business.

How companies shifted focus on digital space more than conventional marketing practices:

- 82% of consumers look up a product online before buying
- 79% of Americans do at least part of their shopping online
- US Digital Marketing spend will rise to about \$332 billion in 2021.

With shifting gears to digital space, following are the few benefits companies can easily get. Cost effective marketing strategy: To start any business online companies need not invest more on marketing efforts, it just needs websites, blogs, social presence and few of the tools to measure the outcomes.

**Reach more people than ever:** With the rise of internet users, the internet makes it easier to scale your marketing efforts and reach way more people in your area.

**Measure with ease:** With the help of digital analytics tools companies can easily check, how much traffic they are getting, how many people have consumed the content / assets, time spent on the webpages, clicks, conversions and many more.

Key components of digital marketing

Most important elements of a digital campaign consist of mobile considerations, organic search, social media marketing, content marketing and lead nurturing.

### **Chapter 3: Problem Statement**

Companies often spend lot of time looking at Google Trends or analysing what competitors are doing when we have a lot of work to do ourselves.

One of the retail leader wants to use their digital marketing data source to build an efficient forecasting model to predict the sales, using historical sales data for the past 2 years on a month-on-month basis.

The retailer aiming to launch a new strategy and want to learn from the past one. Sales and promotional information are available for each month.

The retailer also wants to understand the internal and external factors which can affect the future sales.

Internal factors include, Visits, conversion rate, bounce rate, time spent on website, SEO strategies, product portfolio, promotional activities, traffic sources and investment.

External factors include the Competitors, High-demand periods, trends, changes in regulations etc.,

With all these factors affecting to sales, the customer wants to understand future demand & supply and how much revenue they are going to get it month on month.

## **Chapter 4: Objectives of the Study**

The main objective of this project is to help management and sales team to provide forecasted sales values so that they can take effective decisions.

The forecasted values will also tell the story related to how better the company can optimize Organic campaigns and Paid campaigns. For all the Paid campaigns (Search, Display and Social) what are the right investment they have to make to get desired clicks and conversions.

If the forecasted numbers showing decrease in sales then marketers have to revisit the content strategy all POE's(Paid, Earned and Owned). Also, they have to dig more into competitor analysis so that they can pitch the right content at right time.

If market is uncertain due to some socio-economic factors, political reasons and any pandemic situations the forecasted numbers will come handy in making company offerings based on that it may be price reduction, safety, hygiene and other factors.

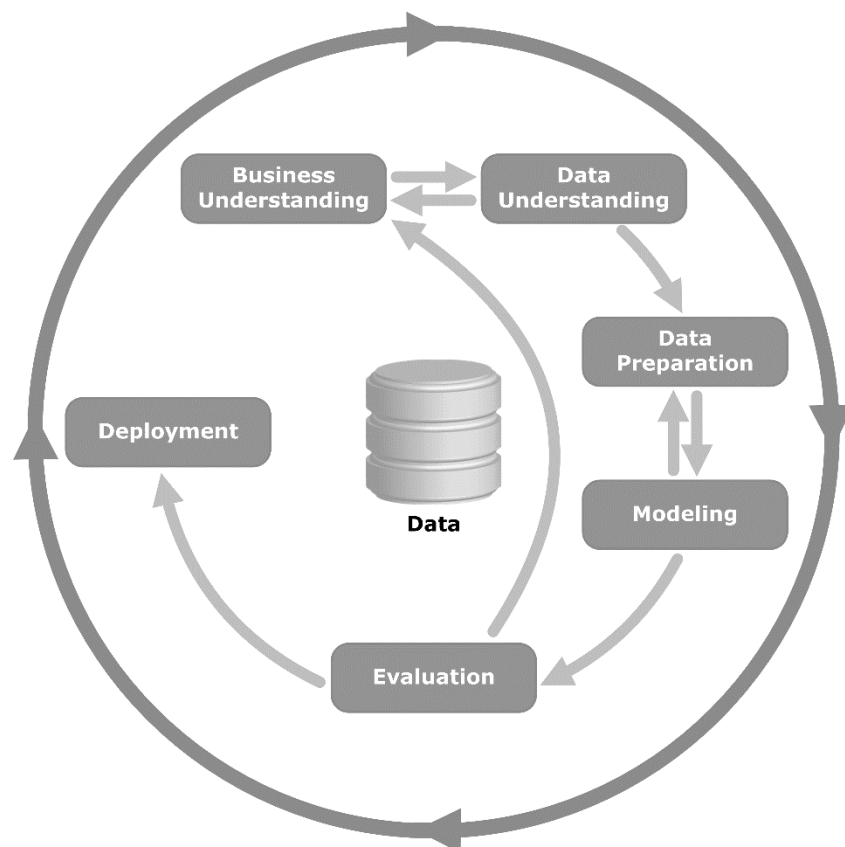
## Chapter 5: Project Methodology

For this project, we used CRISP-DM methodology to successfully execute and implement.

Where CRISP-DM stands for cross-industry process for data mining. This methodology provides structured approach to planning any data science projects.

There are six major phases in CRISP-DM

1. Business Understanding
2. Data Understanding
3. Data Preparation
4. Modeling
5. Evaluation
6. Deployment



**Figure 1**

Each step mentioned above has been explained in detail in the following section.

## **Chapter 6: Business Understanding**

With Online Advertising industry growing rapidly and reaching millions of people over content ads, banner ads, social ads and native ads. It is very important for companies to invest more on optimizing the content what they have and continuously improve it over the time.

Amazon Advertising is one of the important ad platforms where competitors are bidding for space for their products / services. It is the best place for displaying native ads as it allows advertisers to choose the placement based on related products and services.

The sponsored ads in Amazon gets more clicks and conversions compared to other channels as the Click Through Rate (CTR) and Conversion rates are high as it is a eCommerce site.

For any retailer it is very important to stay in top of the ad placement, bid wisely and optimize content accordingly. The campaigns must be carefully crafted as there is huge competition for the ad space. It is also important to analyse competitor strategy, placement and budget we are going to spend. So, it is necessary to execute the forecasting model to predict the future sales and accordingly adjust the budgeting strategy.

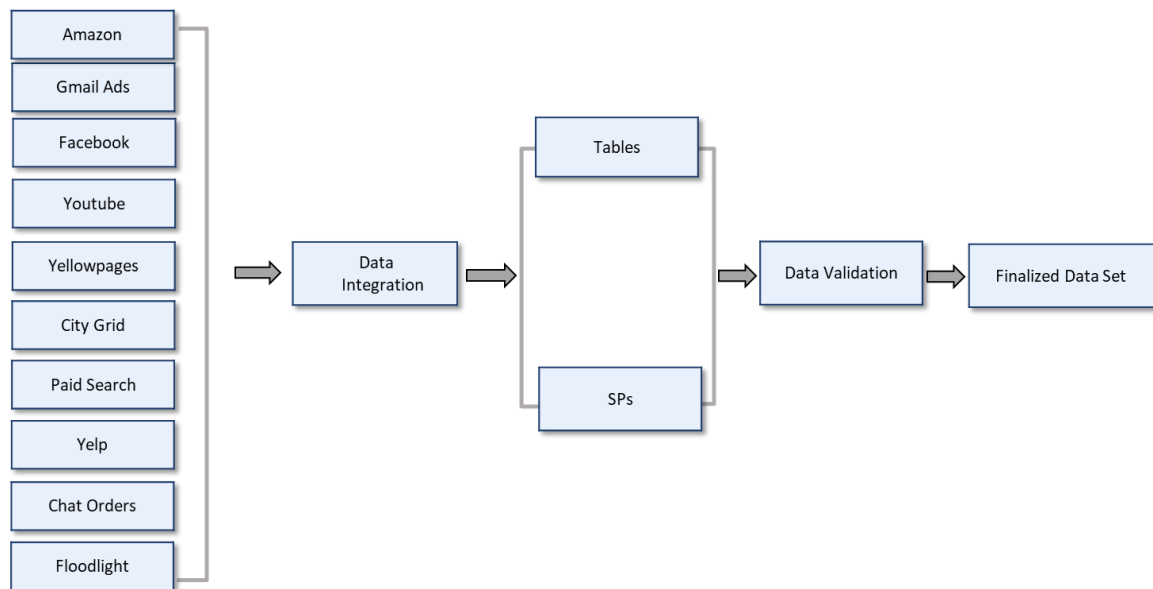
Sales forecasting helps in solving following problems:

- Improve CTR
- More conversions
- Budget Management
- Keep sufficient items in inventory
- Content strategy
- Placement and bidding wisely

## Chapter 7: Data Understanding

For this project work we have collected two years data.

Overall, we have 80K observations, 10 media types, 12 variables.



**Figure 2**

Following are the metrics we are considering for analyzing and modeling purpose:

- Year
- Week
- Month
- Tactics
- Tech
- MediaType
- Sales Unit Count
- Calls
- Strategy
- Impressions
- Clicks
- Spend
- Serviceable
- Not Serviceable
- Device

we are considering the Amazon advertising data for analysing and forecasting for next six months.

## **Chapter 8: Data Preparation**

We have collected data from two years from Amazon advertising which consists of impression, clicks, conversions and spend on daily bases.

Through this data we performed Exploratory Data Analysis (EDA) and understood that year on year the spend is increasing, the keywords bids are getting costlier due to raise in competition for ad inventory.

Also, compared the technology wise clicks ratio on year on year which provided a great insight on how one of the Tech platform continuously getting more clicks compared to others.

As our advertising campaign is segmented based on tactics which describes based on customers. The Retargeting and Prospecting tactic getting higher tactics as it drill down customers based on past search, interest and other psychographic information.



## Chapter 9: Data Modeling

Based on the above mentioned 15 variables we have used three forecasting models to test the accuracy.

- Holt-winters model
- ARIMA
- LSTM

For getting better MAPE, we ran linear regression model to identify the significant variables in our dataset and finally based on the p-value we have included the three variables which are important for our forecasting model.

- Impressions
- Clicks
- Conversions

We considered the above variables and ran ARIMAX model.

Out of all the model outputs, ARIMAX model provided the better MAPE.

No.	Model	Accuracy (MAPE)
1	Holt-winters model	12.63%
2	ARIMA	11.86%
3	LSTM	15.62%
4	ARIMAX	9.53%

**Table 1**

## **Chapter 9: Data Evaluation**

After selecting ARIMAX model and forecasted the values for next six months we closed monitored the numbers we are getting in subsequent month and the sales numbers are inline with what we forecasted.

We are executing this model on every month and forecasting for next six months.

## **Chapter 10: Deployment**

The model tested for first three months and results of sales are promising with forecasted values so the sales team has deployed the model results in SQL table and integrated with PowerBI live dashboard.

## **Chapter 11: Analysis and Results**

The forecasted results are now available on Sales Reports so all marketing and sales teams can use this table to strategize the marketing and advertising efforts based on forecasted values.

## **Chapter 12: Conclusions and Recommendations for future work**

Forecasting the sales values provided a great addition to marketing and advertising efforts. It also helped the retailer to focus more on high demand products and strategies in spending patterns.

The current model needs to be updated every three months using different variables and test and reconsider the important variables. Also, it is an continuous iterative model where we need to apply different algorithms to get better accuracy.

## **Bibliography**

Forecasting: [Principles & Practice - Rob J Hyndman](#).

## **Appendix**

**Plagiarism Report<sup>1</sup>**

**Publications in a Journal/Conference Presented/White Paper<sup>2</sup>**

**Any Additional Details**

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<sup>1</sup> Turnitn report to be attached from the University.

<sup>2</sup> URL of the white paper/Paper published in a Journal/Paper presented in a Conference/Certificates to be provided.