A person using a tablet in a warehouse

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**Assessment – 1st**

**Capstone: Industry Case Studies Industry Review**

**SUBJECT CODE: DATA6000**

**SUBJECT NAME: CAPSTON: INDUSTRY CASE STUDIES**

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# 1. Chosen Industry

Australia's digital retailing industry has expanded exponentially, primarily because of the e-commerce infrastructure, convenience, competitive pricing, and wide variety of products. The leaders in this field are Woolworths, Coles, and JB Hi-Fi, with emerging start-ups and mobile commerce.

## 1.1. Increasing Marketing Spending/Clicks

The year-over-year growth for both domestic and international merchants in all industries shows that retail leads the pack at a 30.4% growth (domestic).

A graph of a number of people

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**Figure 1: Annual growth in online retail spending in Australia as of September 2024, by category**

(Source: Statista, 2024)

## 1.2. Decreasing Ad Click Rate

The Click-through rate by ads in Retail is 1.04% behind Legal at 1.59%, and Apparel at 1.24%.

A graph of a bar chart

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**Figure 2: Ad Click-Through Rate by Industry**

(Source: Gardner, 2023)

## 1.3. Decreasing Conversion Rate

A decline in conversion rates of traditional retail trade turnover from October 2022 suggests a decline in consumer engagement.

A graph of the fall of the country

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**Figure 3: Retail Industry Insights & Outlook Australia, 2023**

(Source: Woolford, 2023)

# 2. Literature Review

## 2.1. Increasing Marketing Spending/Clicks

Wang & McCarthy, 2020 discovered that informative and mixed content generates engagement efficiently, thereby optimizing marketing spending and clicks for retail banking in Australia. It shows the impact of COVID-19 on the labour market, its challenges, and the role played by the JobKeeper program in market spending (Borland & Charlton 2020). Improved at increasing and beneficial cost, this farm animal welfare was also made easier with a stakeholder choice of improving results through a tool (Fernandes et al. 2021). IoT contributes to the integration of supply chains, improved performance, and support for sustainable retail operations in Australia (de Vass et al. 2020). Increased consumer experience, consumer-brand relationships, and marketing competitiveness, contributing to solving the adoption problem for retail marketing in Australia (Rejeb et al. 2021).

## 2.2. Decreasing Ad Click Rate

This study by Colbert et al. (2022) indicates that online alcohol retailers employ direct marketing. It identifies strategies for effective advertisement for marketing an app that promotes physical activity, with hard-selling and health themes that can work to increase click-through rates (Northcott et al. 2021). The click fraud made by bots illuminates the tricks that help to identify more damage in terms of click-through rates on advertisements (Sadeghpour & Vlajic 2021). Baidu's GPU-based CTR models with techniques of quantization, improving prediction accuracy, and increasing click-through rates and revenue (Xu et al. 2021). AI-based approaches to click fraud detection and prevention while improving click-through rates and revenue for advertisers in online advertising (Alzahrani & Aljabri 2022).

## 2.3. Decreasing Conversion Rate

Venkatasubbu et al. (2022) discussed the application of predictive analytics to optimize inventory, improving customer engagement and conversion rates in retail. Global exchange rate systems with a focus on the US dollar and the rise of China, indirectly influence international retail conversion rates (Ilzetzki et al. 2022). Customer-centric frameworks for improving formats about reduction in friction and creating retail that adds value by promoting improvements in conversion rates (Gauri et al. 2020). Government financial support has relieved the pandemic impact on the industries (Huynh et al. 2021). Consumer behaviour studies and policy intervention resulted in organic consumption in a way that enhanced demand by transforming the retail landscape (Taghikhah et al. 2020).

# 3. Data Sources

## 3.1. Increasing Marketing Spending/Clicks

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**Figure 4: Dataset 1**

<https://www.kaggle.com/datasets/naniruddhan/online-advertising-digital-marketing-data?select=online_advertising_performance_data.csv>

The table shows various performance metrics of online campaigns of advertisements, including data such as user engagement, banner size, placement, displays, cost, clicks, and revenue. It includes each row as an individual combination of campaign and banner size and placement on any particular day in April. User\_engagement and the metrics for impressions such as displays, cost including advertising spend, clicks and well as revenue-sources including sales generated will be captured for a set of sizes: 160x600, 240x400 and 300x250 for each of three placements: "abc," "def," and "mno." This information gives critical insight into the ability that would be shown in such campaigns with various strategies with different ad placements.

## 3.2. Decreasing Ad Click Rate

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**Figure 5: Dataset 2**

<https://www.kaggle.com/datasets/rabieelkharoua/predict-conversion-in-digital-marketing-dataset>

The table reports customer data with performance metrics as part of a digital marketing campaign and by channel. The key columns are CustomerID, Age, Gender, Income, and CampaignChannel (for example, Social Media, Email, PPC, SEO). The table tracks AdSpend, ClickThroughRate, ConversionRate, and WebsiteVisits for each customer. The CampaignType will indicate the purpose of the campaign, such as Awareness, Retention, Consideration, or Conversion. This data can be used to analyze campaign effectiveness, customer demographics, and how different channels and types affect engagement and conversions.

## 3.3. Decreasing Conversion Rate

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**Figure 6: Dataset 3**

<https://www.kaggle.com/datasets/arashnic/ctr-in-advertisement>

The table tracks the user's interaction with a product in a digital advertisement campaign. It gives insight into the behaviour of the users and major columns include session ID, user ID, product ID, campaign ID, webpage ID, and user demographics such as gender. Data statistics will help determine trends that show popular product categories, the number of male and female users, and campaign success: the number of sessions per campaign. Measuring engagement helps predict session frequency for users and will show how repeat interaction occurs. Such information can help in the efficient optimization of campaigns, improvement of targeting, and enriching product offerings by following up on user preferences.

# 4. Business Problem

Out of all the three major business problems which have been stated, The decrease in the conversion rate is the main focus, and due to this, the prediction of the conversion in the digital marketing data set will be taken into consideration to analyse the data set completely to cheque the factors responsible. Also solving this business problem is important because if the overall conversion is less then there will be no use of any advertisement or digital marketing.

The main focus is using descriptive analytics as of now, making the comparison of different parameters and studying them, and understanding the reason for the lower conversion rate and the factors impacting the conversion rate based on which the future prediction can be made using the classification model, using machine learning algorithms.

A screen shot of a computer screen

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The comparison of average age based on average time spent on the site. For both males and females, shows that most of the website visitors are of average age between 40 to 46 female spend more time on the websites compared to males, And female website visit count is also higher.

A screenshot of a graph

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The conversion total is based on different campaign channels and the campaign type dividend on the basis of gender shows The campaign type of referral getting more conversions, followed by PPC and much less by social media overall conversion is higher but the retention is lower and the count for female is 1.5 times more than that of male.

A screen shot of a graph

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The sum of ad spent and the sum of email clicks for different campaign channels shows the edge spent value increases more than the overall email clicks and the campaign of referral as well as email are the most responsive compared to social media. However, the expense is more than the return obtained.

Overall, the complete study is unique and provides the perspective of the original solution using descriptive visualisation to solve the business problem

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