

DATA-DRIVEN E-CRM MODEL FOR ACTIVE ONLINE  
ENGAGEMENT FOR SMES IN MALAYSIA

ADRIANO TANG CHIN HOONG

MASTER OF SCIENCE (COMPUTER SCIENCE)

FACULTY OF INFORMATION AND COMMUNICATION  
TECHNOLOGY  
UNIVERSITI TUNKU ABDUL RAHMAN  
JANUARY 2024

**DATA-DRIVEN E-CRM MODEL FOR ACTIVE ONLINE  
ENGAGEMENT FOR SMES IN MALAYSIA**

By

**ADRIANO TANG CHIN HOONG**

A dissertation submitted to the Department of Computer and Communication  
Technology  
Faculty of Information and Communication Technology,  
Universiti Tunku Abdul Rahman,  
in partial fulfilment of the requirements for the degree of  
Master of Science  
January 2024

## **ABSTRACT**

This dissertation aims to propose a robust Data-Driven e-CRM model designed to empower online enterprises, especially Small and Medium Enterprises in Malaysia, to achieve economic sustainability during their interactions with prospects and customers. The model integrates web analytics and e-CRM to foster active online engagement, offering a multi-disciplinary approach that bridges Computer Science and business realms.

The study commences with an exhaustive review of existing literature to comprehensively explore the significance of Customer Relationship Management in diverse online commerce contexts. It then investigates the significance of web analytics in the realm of online commerce. Special attention is given to understanding the feasibility and potential benefits of developing a model for active online engagement tailored specifically for SMEs in Malaysia. This literature review sets the foundation for proposing an innovative and contextually relevant model.

The recommended approach advocates for the integration of web analytics with e-CRM to facilitate automated engagements and re-engagements through pre-set drip campaigns. This proactive strategy allows companies to take immediate actions during campaigns, transforming the conventional post-campaign analysis paradigm. The model further enables seamless modifications to web content, design, and landing pages using a spectrum of approaches from no-code to high-code. The dissertation contends that this integration enhances operational and innovation performance, fostering new paradigms in business operations.

The selection of web analytics and e-CRM technologies is methodically conducted through a systematic comparison of the leading technologies available. The integration process prioritizes accuracy, reliability, and affordability to ensure its practicality for SMEs with resource constraints.

To gauge the success of the integration, a comprehensive set of quantitative and qualitative metrics are employed. These include website traffic and page views, conversion rates, bounce rates, average session duration, cost spent to acquire new customers, average customer revenue over the entire relationship, and various customer engagement metrics. Additionally, surveys and questionnaires contribute qualitative insights into the customer experience.

The empirical investigation involves three SMEs spanning diverse industries: Food & Beverages, Education, and E-Commerce Platforms. This strategic selection allows for a representative study, showcasing the model's applicability across distinct market demographics. The data compilation and analysis reveal that the integration of web analytics and e-CRM yields superior results compared to their individual applications. The findings underscore the potential of the proposed model in enhancing the online engagement strategies of SMEs, thereby contributing to their sustained economic success in the digital landscape.

## **ACKNOWLEDGEMENT**

I would like to express my sincere gratitude and appreciation to the following individuals and organizations who have played a significant role in the completion of my research work.

First and foremost, I am deeply indebted to my supervisor, Dr. Choo Peng Ying, for his invaluable guidance, support, and expertise throughout this research journey. His profound knowledge, patience, and continuous encouragement have been instrumental in shaping this study.

I also extend sincere thanks to Dr. Liew Soun Yue, my co-supervisor, for his valuable insights and contributions. His expertise in computer sciences and e-commerce has significantly enriched the research process, broadening my understanding of the subject matter.

Additionally, heartfelt appreciation goes to Dr. Wong Pei Voon for her invaluable guidance in completing my dissertation amendments. I am grateful for her continued support and expertise.

I am forever grateful to my mother, Madam Jacqueline Tan Mei Ling, for her unwavering love, encouragement, and unwavering support throughout my academic endeavours. Her sacrifices, belief in my abilities, and constant motivation have been the cornerstone of my success.

I would like to acknowledge Centrec Training & Consultancy, especially Miss Christine Ong Bee San and Miss Teoh Chia Wen for their collaboration and assistance in the development and implementation of the research project. Their expertise and resources have significantly contributed to the success of this work.

I also would like to extend my gratitude to DietChain (Malaysia) Sdn. Bhd, and Universiti Tunku Abdul Rahman Kampar Campus for their generous support and cooperation in providing access to necessary data, resources, and facilities. Their contribution has greatly enhanced the quality and relevance of this research.

I would also like to acknowledge the valuable input and feedback received from my colleagues and friends, who have provided insightful discussions and constructive criticism throughout this research endeavour. Their perspectives have helped me refine my ideas and strengthen the overall study.

Finally, I would like to express my deep appreciation to all the participants who volunteered their time and shared their valuable insights, without whom this research would not have been possible. Their willingness to participate and contribute to this study has been truly invaluable.

In conclusion, I am grateful to everyone who has supported and believed in me during this research journey. Their contributions, both big and small, have made a significant impact on the successful completion of this work.

## APPROVAL SHEET

This dissertation entitled “**DATA DRIVEN E-CRM MODEL FOR ACTIVE ONLINE ENGAGEMENT FOR SMES IN MALAYSIA**” was prepared by ADRIANO TANG CHIN HOONG and submitted as partial fulfilment of the requirements for the degree of Master of Science at Universiti Tunku Abdul Rahman.

Approved by:



\_\_\_\_\_  
(DR CHOO/PENG YIN)

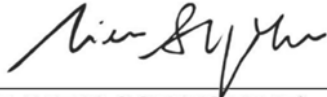
Date: 11/01/2024

Supervisor

Department of Digital Economy Technology

Faculty of Information and Communication Technology

Universiti Tunku Abdul Rahman



\_\_\_\_\_  
(DR LIEW SOUNG YUE)

Date: 11/01/2024

Co-supervisor

Department of Computer and Communication Technology

Faculty of Information and Communication Technology

Universiti Tunku Abdul Rahman

## SUBMISSION SHEET

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

UNIVERSITI TUNKU ABDUL RAHMAN

Date: 11/01/2024

### SUBMISSION OF FINAL YEAR PROJECT /DISSERTATION/THESIS

It is hereby certified that ADRIANO TANG CHIN HOONG (ID No: 17ACM06844) has completed this ~~final year project~~/ dissertation/ ~~thesis~~\* entitled "DATA DRIVEN E-CRM MODEL FOR ACTIVE ONLINE ENGAGEMENT FOR SMES IN MALAYSIA" under the supervision of Dr Choo Peng Yin (Supervisor) from the Department of Digital Economy Technology, Faculty of Information and Communication Technology , and Dr Liew Soung Yue (Co-Supervisor)\* from the Department of Computer and Communication Technology, Faculty of Information and Communication Technology.

I understand that University will upload softcopy of my ~~final year project~~ / dissertation/ ~~thesis~~\* in pdf format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.

Yours truly,

ADRIANO TANG CHIN HOONG  
(*Student Name*)

\*Delete whichever not applicable



## DECLARATION

I hereby declare that the dissertation is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.

Name ADRIANO TANG CHIN HOONG

Date 11/01/2024

# Table of Contents

<i>ABSTRACT</i> .....	<i>I</i>
<i>ACKNOWLEDGEMENT</i> .....	<i>III</i>
<i>APPROVAL SHEET</i> .....	<i>V</i>
<i>SUBMISSION SHEET</i> .....	<i>VI</i>
<i>DECLARATION</i> .....	<i>VII</i>
<i>LIST OF TABLES</i> .....	<i>XII</i>
<i>LIST OF FIGURES</i> .....	<i>XIII</i>
<i>LIST OF ABBREVIATIONS</i> .....	<i>XIV</i>
<i>1.0 Introduction</i> .....	<i>1</i>
1.1. Background and Context of SMEs within the Malaysian .....	2
1.2. Problem Statement and Research Objective.....	4
1.3. Research Questions .....	7
1.4. Importance and Extent of the Study .....	7
1.4.1. Importance of the Study.....	7
1.4.2. Study Scope .....	8
<i>2.0 Review of Existing Literature</i> .....	<i>10</i>
2.1. Exploring the Role of CRM in Diverse E-Commerce Contexts .....	10
2.2. Significance of Web Analytics in E-Commerce .....	12
2.3. The Integration of e-CRM and Web Analytics: A Contemporary Perspective .....	13
2.4. Leveraging Data Insights Through e-CRM and Web Analytics Integration .....	14
2.5. List of Key papers .....	15

3.0	<i>Methodology of The Research</i> .....	17
3.1	Study Design and Approach.....	17
3.1.1.	Methodology.....	17
3.1.2.	Data Collection.....	18
3.1.3.	Data Analysis.....	18
3.2	Surveys and Questionnaires.....	19
3.3	Interviews and Focus Groups.....	25
3.4	Sample Selection and Participants.....	27
3.5	Data Analysis Techniques.....	28
3.5.1.	Qualitative Analysis.....	29
3.5.2.	Quantitative Analysis.....	31
3.6	Ethical Considerations.....	33
3.7	Selection of Technologies.....	35
3.8	Selection of Web Analytic.....	37
3.9	Selection of e-CRM.....	39
3.10	Integration Plans.....	40
3.10.1.	Improving Existing Marketing Campaign Flow.....	40
3.10.2.	System Integration of Web Analytics With E-CRM.....	43
4.0	<i>Data-Driven E-CRM Model</i> .....	58
4.1	Materials and Tools Utilized in the Study.....	58
4.1.1.	Samples.....	58
4.1.2.	Chosen Sites.....	59

4.1.3.	Procedures.....	59
4.1.4.	Hardware and Software.....	62
4.1.5.	Programming and Common Language .....	63
4.2	Measurement .....	63
4.3	Data Analysis .....	66
4.3.1.	Validity and Reliability.....	67
5.0	<i>Discussion of Results.....</i>	<i>69</i>
5.1	Case Study 1: Food & Beverage Site – DietChain.....	69
5.2	Case Study 2: Universiti Tunku Abdul Rahman (UTAR).....	78
5.3	E-Commerce Site .....	94
5.4	Implementation Outcomes – Qualitative Findings.....	100
5.4.1.	Customer surveys and interviews conducted.....	100
5.4.2.	Employee surveys and interviews conducted .....	102
5.5	General Discussion.....	105
6.0	<i>Research Limitation, Opportunities for Future Research and Conclusion of Research.....</i>	<i>110</i>
6.1	Research Limitation .....	110
6.2	Opportunities for Future Research and Conclusion .....	114
6.2.1.	Opportunities for Future Research.....	114
6.2.2.	Conclusion of Research .....	116
7.0	<i>References.....</i>	<i>118</i>

8.0	<i>Appendices</i> .....	121
8.1	Public Service Innovation Awards 2019 – Silver Award.....	121
8.2	Appreciation Letter from DietChain Sdn. Bhd.....	122
8.3	MoU Between UTAR and CENTREC.....	123

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
<b>Table 2-1</b> Summary of Key Papers .....	15
<b>Table 3-1:</b> Sample Questionnaire.....	23
<b>Table 3-2:</b> Sample Interview Questions.....	25
<b>Table 3-3:</b> Factors involves in technologies selection .....	36
<b>Table 3-4:</b> Reasons of selecting Matomo Analytics .....	38
<b>Table 3-5:</b> List of e-CRM with Drip Campaign Features .....	39
<b>Table 3-6:</b> Challenges faced by the common tracking methods. ....	54
<b>Table 3-7:</b> Generation of visitorID.....	55
<b>Table 4-1:</b> Demographic by site.....	59
<b>Table 4-2:</b> Justification of Sample Size .....	61
<b>Table 4-3:</b> List of Hardware and Software.....	62
<b>Table 4-4:</b> List of Languages for programming and executing commands ....	63
<b>Table 4-5:</b> Consideration for Validity and Reliability .....	68
<b>Table 5-1:</b> Customer feedback on Marketing information.....	100
<b>Table 5-2:</b> Company Response Time.....	101
<b>Table 5-3:</b> User-friendliness using the Data-Driven E-CRM .....	102
<b>Table 5-4:</b> Data-Driven E-CRM User Experience (UX) .....	104

## LIST OF FIGURES

<b>Table</b>	<b>Page</b>
<b>Figure 3-1:</b> Technologies selection flow .....	35
<b>Figure 3-2:</b> Existing Marketing Campaign Flow vs. New Flow.....	40
<b>Figure 3-3:</b> Actual Implementation.....	43
<b>Figure 3-4:</b> A correctly configured Matomo instance with fingerprint .....	55
<b>Figure 3-5:</b> Methods on How Matomo Track every customer .....	57
<b>Figure 5-1:</b> Orders & sales during pre & post-implementation .....	71
<b>Figure 5-2:</b> Impact of the system on the number of visitors.....	72
<b>Figure 5-3:</b> Impact of the system on the bounce rate.....	74
<b>Figure 5-4:</b> Impact of the system on the average visit duration.....	75
<b>Figure 5-5:</b> Facebook Page Reach. ....	78
<b>Figure 5-6:</b> Variety of posting to attract visitors.....	80
<b>Figure 5-7:</b> Visitor Acquisition Overview .....	81
<b>Figure 5-8:</b> Initial group sharing .....	82
<b>Figure 5-9:</b> Second group sharing.....	83
<b>Figure 5-10:</b> Number of followers vs. Campaign Success .....	84
<b>Figure 5-11:</b> Campaign success with the proposed model .....	87
<b>Figure 5-12:</b> Campaign Successfully reaching its target audiences .....	91
<b>Figure 5-13:</b> Clearance of Sales within 3 months.....	94
<b>Figure 5-14:</b> Success in e-commerce sector with the proposed model.....	97
<b>Figure 5-15:</b> Article Relevancy.....	101
<b>Figure 5-16:</b> Company Response Time .....	102
<b>Figure 5-17:</b> User-friendliness .....	103
<b>Figure 5-18:</b> User Experience (UX).....	105
<b>Figure 5-19:</b> A normal design to attract customers.....	106
<b>Figure 5-20:</b> Version B of Figure 5-19 .....	107

## LIST OF ABBREVIATIONS

SMEs	Small and Medium Enterprises
GDP	Gross Domestic Product
e-CRM	Electronic Customer Relationship Management
KPIs	Key Performance Indicators
GDPR	General Data Protection Regulation
HIPAA	Health Insurance Portability and Accountability Act
PDPA	Personal Data Protection Act
ROI	Return on Investment
API	Application Programming Interface
IP	Internet Protocol
Wi-Fi	Wireless Fidelity
visitorID	Visitor Identification
userID	User Identification
SHA	Secure Hash Algorithms
COVID-19	Coronavirus Disease 19
F&B	Food & Beverages
VPS	Virtual Private Server
VMWare	Virtual Machine Ware
XAMPP	Cross-Platform, Apache, MySQL, PHP, and Perl
LAMP	Linux, Apache, MySQL, and PHP
LEMP	Linux an nginx, Apache, MySQL, and
PHP	Hypertext Preprocessor
CRUD	Create, Read, Update and Delete
HTML	Hypertext Markup Language



CSS	Cascading Style Sheets
AJAX	Asynchronous JavaScript And XML
CPA	Cost Per Acquisition
MCO	Movement Control Order
UTAR	Universiti Tunku Abdul Rahman
DDET	Digital Economy Technology
MDEC	Malaysia Digital Economy Corporation
Fintech	Financial Technology
Proptech	Property Technology
PM	Private Message
A&P	Advertisement & Promotion

# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

In the current digital era, Malaysia's small and medium-sized enterprises (SMEs) are increasingly recognizing the importance of active online engagement to stay competitive in the market. To effectively engage with their customers, SMEs can leverage a data-driven e-CRM (electronic Customer Relationship Management) model. This model combines the power of data analytics with customer relationship management strategies, enabling SMEs to drive meaningful interactions, build stronger relationships, and foster business growth [1].

By implementing a data-driven e-CRM model, SMEs can harness the wealth of customer data available via diverse digital platforms including websites, social media platforms, and email campaigns. This data includes customer preferences, behaviours, and purchase patterns, which can offer valuable perspectives on customer requirements and inclinations. With this knowledge, SMEs can customize their marketing initiatives and communication strategies to engage with their intended audience actively [2].

The data-driven e-CRM model also enables SMEs to personalize customer experiences by delivering relevant and timely content, offers, and recommendations. By understanding customer preferences and past interactions, SMEs can develop focused marketing initiatives that strongly connect with their intended audience, thereby enhancing customer involvement and allegiance [3].

Furthermore, the data-driven e-CRM model allows SMEs to monitor and evaluate the efficacy of their online engagement strategies, SMEs can acquire valuable perspectives on the efficiency of their marketing endeavours. Critical indicators such as click-through rates, customer lifetime value and conversion rates offer meaningful data for analysis. This data-driven approach empowers SMEs to optimize their online engagement strategies, identify areas for improvement, and allocate resources effectively [4].

Implementing a data-driven e-CRM model requires SMEs to leverage technology solutions such as CRM software and web analytics tools. These tools enable SMEs to collect, analyse, and interpret customer data, providing a solid foundation for decision-making and strategic planning [5].

### **1.1. Background and Context of SMEs within the Malaysian**

Malaysia's economy relies heavily on the foundation provided by SMEs, constituting a substantial share of the Gross Domestic Product (GDP)

and providing employment to a significant portion of the workforce. They contribute to economic diversification and entrepreneurship [6].

The Malaysian government recognizes the importance of SMEs and has implemented various initiatives to promote their growth and competitiveness. These encompass financial backing, capacity-building initiatives, and policy revisions aimed at establishing a favourable business environment [7].

Due to the swift progress in technology and the increasing prevalence of the Internet, SMEs in Malaysia are increasingly embracing digitalization to improve their operations and reach a wider customer base. This includes establishing online platforms and utilizing e-commerce channels [8].

Data-driven e-CRM refers to the use of customer data, collected through various digital channels, to effectively manage customer relationships and enhance engagement. It encompasses the methodical gathering, evaluation and application of customer data for precise marketing and tailored customer interactions [9].

Implementing a data-driven e-CRM model can provide several advantages for SMEs in Malaysia, such as SMEs can obtain valuable understandings regarding customer behaviour, preferences, and purchase patterns, enabling them to customize their products and

services accordingly. By leveraging customer data, SMEs can create personalized marketing campaigns, improving customer targeting and increasing conversion rates. Through data-driven e-CRM, SMEs can establish ongoing communication with customers, building relationships and fostering loyalty [10].

Automation of CRM processes can streamline operations, reduce manual efforts, and optimize resource allocation [11]. Active online engagement is crucial for SMEs to reach and connect with customers in the digital realm effectively. This involves activities such as maintaining a strong online presence through websites and social media, utilizing online marketing strategies, providing prompt customer support, and leveraging data-driven insights to tailor engagement strategies.

Overall, the context of SMEs in Malaysia concerning data-driven e-CRM models for active online engagement highlights the increasing importance of digital transformation and customer-centric approaches. By leveraging the potential of data and technology, SMEs can enhance their competitiveness, grow their clientele, and cultivate sustainable expansion in the evolving digital landscape.

## **1.2. Problem Statement and Research Objective**

In today's digital landscape, SMEs in Malaysia are increasingly recognizing the importance of online engagement and CRM practices to create and uphold robust connections with their customers.

Nevertheless, a notable obstacle encountered by these SMEs is the lack of effective data-driven e-CRM models specifically designed to meet their unique requirements and limitations.

Firstly, SMEs often struggle with the gathering, evaluation and application of customer data to drive online engagement [12]. Limited resources and expertise hinder their ability to effectively capture and aggregate data from diverse channels like websites, social media platforms, and email initiatives. As a result, SMEs may lack a comprehensive understanding of their customers' inclinations, behaviours, and requirements, making it difficult to tailor engagement strategies accordingly.

Secondly, the lack of a robust e-CRM model tailored for SMEs limits their ability to analyse and interpret customer data in a meaningful way. SMEs may lack the necessary tools, technologies, and knowledge to extract valuable insights from the collected data [13]. This prevents them from identifying patterns, trends, and opportunities for targeted and personalized engagement, ultimately hindering their ability to establish robust customer connections and cultivate brand allegiance.

Furthermore, the absence of a tailored e-CRM model makes it challenging for SMEs to implement automation and personalisation strategies effectively. Automation tools and personalization techniques are crucial for delivering timely and relevant messages to customers, but

SMEs may struggle with implementing such systems due to limited resources or technical expertise [14]. Without automation and personalization, SMEs may struggle to engage with customers in a timely, relevant, and meaningful manner, diminishing the effectiveness of their online engagement efforts.

Given these challenges, there is a pressing need to develop a data-driven e-CRM model specifically designed for SMEs in Malaysia. Such a model should take into account the limited resources, technical capabilities, and expertise typically associated with SMEs. By addressing these limitations, a tailored e-CRM model can enable SMEs to effectively collect, analyse, and utilize customer data for active online engagement. This would involve implementing user-friendly data collection mechanisms, employing data analysis techniques that require minimal technical expertise, and providing automation and personalization features that are accessible and cost-effective.

Ultimately, the development of a data-driven e-CRM model for active online engagement tailored to SMEs in Malaysia is crucial to empower these businesses to harness the potential of customer data, enhance their online engagement strategies, cultivate brand allegiance and attain enduring growth in the competitive digital market.

### **1.3. Research Questions**

When researching data-driven e-CRM models for active online engagement for SMEs in Malaysia, the research tries to supply responses to the following research queries:

- a. What are the current levels of adoption and implementation of data-driven e-CRM models among SMEs in Malaysia [15]?
- b. How does the use of data-driven e-CRM models impact SMEs' customer engagement and satisfaction levels in the online environment [16]?
- c. What are the most effective strategies and techniques for leveraging customer data in data-driven e-CRM models to enhance SMEs' online engagement in Malaysia [17]?

### **1.4. Importance and Extent of the Study**

#### **1.4.1. Importance of the Study**

The study aims to empower SMEs in Malaysia by providing them with a data-driven e-CRM model for active online engagement. This model can enable SMEs to leverage customer data effectively, enhancing their competitiveness in the digital marketplace. By utilizing customer data, SMEs can develop personalized engagement strategies, leading to improved customer relationships. This can result in increased customer satisfaction, loyalty, and ultimately, business growth. The study seeks to address the resource limitations commonly faced by SMEs. By developing a tailored e-CRM model that considers limited resources and



technical expertise, SMEs can optimize their resource utilization while still benefiting from data-driven online engagement.

The study contributes to the field of e-CRM and online engagement by developing a model specifically designed for SMEs in Malaysia. It adds to the existing body of knowledge regarding the effective utilization of customer data in the context of SMEs, thus benefiting future research and scholarly discussions.

#### **1.4.2. Study Scope**

The research concentrates on SMEs within Malaysia, acknowledging their unique attributes, constraints, and requirements. It acknowledges the varied nature of SMEs spanning various industries and sectors. The study concentrates on developing a data-driven e-CRM model that emphasizes the collection, analysis, and utilization of customer data for active online engagement. It aims to provide SMEs with practical guidance on implementing such a model.

The study considers the technical aspects of implementing the e-CRM model, taking into account the available resources, tools, and technologies commonly used by SMEs. It aims to provide practical recommendations for implementing automation and personalization techniques without significant technical barriers. The study also investigates the influence of the data-driven e-CRM model on business growth and customer contentment. It aims to measure the effectiveness

of the model in enhancing customer relationships and driving tangible outcomes for SMEs in terms of increased sales, customer retention, and positive customer experiences.

It is worth noting that the study does have certain limitations, such as the focus on SMEs in Malaysia and the specific context of the digital marketplace. Nonetheless, the significance and scope of the study provide a valuable foundation for developing a data-driven e-CRM model that can have a positive impact on SMEs' online engagement and overall business performance within Malaysia.

## CHAPTER 2

### REVIEW OF EXISTING LITERATURE

#### 2.0 Review of Existing Literature

To grasp the significance of e-CRM and web analytics for an e-commerce platform, it is advisable to delve into the insights provided by select seminal papers outlined below. These papers constitute integral findings from the conducted literature review.

#### 2.1. Exploring the Role of CRM in Diverse E-Commerce Contexts

The investigation by Enny Khurniasari [18] centred on Tokopedia, emphasizes reinforcement of customer loyalty through e-CRM and technological innovation. The observed mediating effect in customer experience underscores the central position of CRM in shaping positive interactions and fostering enduring loyalty among e-commerce customers. Exploring data mining within a CRM platform within the e-commerce domain highlights the essentiality of CRM tools. Sadath's [19] study sheds light on how CRM platforms function as vital conduits for employing data mining techniques, showcasing CRM's pivotal role in extracting valuable insights from extensive e-commerce data repositories.

In the realm of hotel websites, Mukhlis Yunus's [20] study reveals specific dimensions of e-CRM, underscoring its adaptability across various industries. The research underscores how comprehending and implementing these dimensions can significantly enrich customer relationships within the dynamic e-commerce environment, demonstrating the versatility of CRM principles.

Concentrating on the interplay among digital marketing, trust in online platforms, and the intention to make online purchases, Mukhlis Yunus [20] highlights the mediating role of CRM. This accentuates the critical significance of effective CRM practices in establishing online trust and influencing customer purchase intentions, reinforcing the foundational role of CRM in the intricate e-commerce landscape.

This cumulative body of research communicates a consistent message – the inherent importance of CRM in e-commerce. Whether applied to augment customer loyalty on specific platforms such as Tokopedia, facilitate data mining within CRM platforms, adapt to diverse industries like hospitality, or mediate the intricacies of digital marketing and online trust, CRM emerges as a linchpin in shaping positive customer experiences and driving successful outcomes in the e-commerce arena. As businesses navigate the digital landscape, these studies collectively affirm the indispensability of robust CRM strategies in achieving sustained success.

## **2.2. Significance of Web Analytics in E-Commerce**

Ayodeji [21] delves into the realm of web analytics applications within the context of online retail in India, providing valuable insights into the opportunities and challenges associated with this technology. Their research accentuates the indispensable role of web analytics in elevating the online retail experience, stressing the importance of utilizing these tools to refine business strategies and enhance customer engagement within the dynamic landscape of Indian e-commerce.

Rossi [22] presents an analytical model that compares the profitability of diverse online marketing channels, encompassing search engine marketing and e-commerce marketplaces. Although not solely dedicated to web analytics, their work underscores the critical role of analytical models in evaluating the effectiveness of various channels. It is evident that web analytics likely informs such models, emphasizing its substantial contribution to decision-making in the realm of e-commerce marketing.

Shifting focus to best practices, Miroslav Reiter [23] offers insights into leveraging Google Analytics within the domain of online business. Their study provides practical guidance on optimizing web analytics tools and emphasizes the implementation of industry best practices. The research underscores the pivotal role of Google Analytics as a valuable tool for businesses in the e-commerce arena, emphasizing its significance in monitoring and enhancing online performance.

Collectively, these journals weave a cohesive narrative that underscores the pivotal role of web analytics in the e-commerce landscape. Whether exploring applications in specific regional contexts, understanding the broader impact of data analytics techniques, evaluating the profitability of marketing channels, or providing practical guidance through best practices, these studies collectively affirm the integral role of web analytics in shaping strategies, optimizing performance, and enhancing the overall success of e-commerce ventures.

### **2.3. The Integration of e-CRM and Web Analytics: A Contemporary Perspective**

In recent years, the integration of e-CRM and web analytics has gained prominence as a key strategy for enhancing customer engagement and satisfaction. E-CRM, defined as the utilization of digital channels for managing customer relationships [24], has become a crucial aspect of modern business practices. Concurrently, web analytics provides real-time insights into user behaviour on digital platforms [25], offering a comprehensive understanding of customer interactions. The integration of these two technologies is paramount for businesses seeking to thrive in the competitive digital landscape.

Wang [24] underscores the significance of e-CRM in building and maintaining customer relationships through digital channels. With the integration of web analytics, organizations can attain a profound understanding of customer behaviour, preferences, and engagement

tendencies. This synergy allows for a more personalized and targeted approach in crafting e-CRM strategies, ultimately leading to a more satisfying and meaningful customer experience.

Moreover, the integration of e-CRM and web analytics contributes to data-driven decision-making. Albadi and Almarzooqi [25] highlight the importance of web analytics in providing actionable data on website or application performance. When seamlessly integrated into e-CRM systems, this data becomes instrumental in refining marketing strategies, optimizing user experiences, and tailoring products or services to meet evolving customer needs.

#### **2.4. Leveraging Data Insights Through e-CRM and Web Analytics Integration**

In the dynamic realm of digital business, combining e-CRM and web analytics has emerged as a strategic imperative for organizations aiming to leverage data-driven insights. e-CRM, as conceptualized by Chen and Chen [26], involves the use of electronic channels to manage customer relationships effectively. Web analytics, on the other hand, provides a wealth of data on user interactions with digital platforms [27]. The intersection of these technologies enables businesses to derive actionable insights, optimize decision-making processes, and enhance overall customer satisfaction.

Chen and Chen [26] emphasize the role of e-CRM in utilizing technology to understand and respond to customer needs across digital channels. The integration with web analytics allows organizations to go beyond conventional customer relationship management by tapping into real-time data on user behaviour. This integration is essential for tailoring e-CRM strategies to align with customer preferences, thereby fostering more personalized and meaningful interactions.

Li et al. [27] highlight the significance of web analytics in providing detailed information on user demographics, click-through rates, and conversion metrics. When integrated with e-CRM systems, this data becomes instrumental in anticipating customer needs, identifying areas for improvement, and optimizing marketing efforts. The result is a data-informed approach to decision-making that enhances the efficiency and effectiveness of digital strategies.

## 2.5. List of Key papers

**Table 2-1** Summary of Key Papers

No	Author	Findings
1	Enny Khurniasari [18], 2021	They emphasize the vital role played by e-CRM and technological innovation in fortifying customer loyalty
2	Mukhlis Yunus [20], 2022	Their study reveals specific dimensions of e-CRM, underscoring its adaptability across various industries
3	Ayodeji [21], 2022	Their research accentuates the indispensable role of web analytics in elevating the online retail experience



No	Author	Findings
4	Rossi [22], 2021	Their work underscores the critical role of analytical models in evaluating the effectiveness of various channels
5	Miroslav Reiter [23], 2022	Their study provides practical guidance on optimizing web analytics tools and emphasizes the implementation of industry best practices
6	Wang [24], 2021	e-CRM has become a crucial aspect of modern business practices
7	Almarzooqi [25], 2022	web analytics provides real-time insights into user behaviour on digital platforms
8	Chen [26], 2020	e-CRM is the use of electronic channels to manage customer relationships effectively
9	X. Li [27], 2021	Web analytics provides a wealth of data on user interactions with digital platforms.

## CHAPTER 3

### METHODOLOGY OF THE RESEARCH

#### **3.0 Methodology of The Research**

This segment pertains to the systematic methodology utilized for gathering and analysing data in the study. It encompasses delineating the research design, approaches to collecting data, sampling methods, techniques for data analysis, and addressing ethical considerations.

#### **3.1 Study Design and Approach**

The purpose of this research is to explore the intersection between e-CRM and web analytics. The study aims to understand how organizations can leverage web analytics data to enhance their e-CRM strategies and improve customer experiences. This research design and approach outline the key components of the study, including the inquiry queries, approach, and techniques for gathering and analysing data.

##### **3.1.1. Methodology**

This study will employ a mixed-methods approach, involving methodologies for both qualitative and quantitative data collection and analysis [28]. The study will involve information collected directly from sources (primary data) and data collected from literature reviews and

case studies (secondary data) to provide a comprehensive understanding of the intersection between e-CRM and web analytics.

### 3.1.2. Data Collection

#### a. Primary Data:

**In-depth interviews:** Conduct interviews with e-CRM managers and professionals from organizations across various industries. Explore their experiences, challenges, and best practices in leveraging web analytics for e-CRM.

**Surveys:** Administer surveys to a broader sample of e-CRM practitioners to gather quantitative data on the integration of web analytics and e-CRM, as well as their perceived effectiveness [29].

#### b. Secondary Data:

**Literature Review:** Review academic and industry publications to identify existing theories, frameworks, and case studies related to the intersection of e-CRM and web analytics [30].

**Case Studies:** Analyse documented case studies of organizations that have successfully implemented web analytics in their e-CRM strategies [31].

### 3.1.3. Data Analysis

#### a. Qualitative Data:

**Thematic Analysis:** Analyse interview transcripts to identify key themes and patterns related to the integration of web

analytics and e-CRM. Generate insights and recommendations based on the qualitative findings [32].

b. Quantitative Data:

**Descriptive Statistics:** Summarize survey responses using descriptive statistics to understand the current utilization of web analytics in e-CRM strategies [33].

**Inferential Statistics:** Apply inferential statistics techniques, such as correlation analysis, to examine relationships between variables and identify significant associations [33].

**Findings and Conclusion:** Based on the data analysis, the study will present findings related to the integration of web analytics and e-CRM, the challenges faced by organizations, and the potential benefits of leveraging web analytics data in e-CRM decision-making processes. The research will conclude with recommendations for organizations on how to effectively integrate web analytics into their e-CRM strategies [34].

### 3.2 Surveys and Questionnaires

Throughout this research endeavour, surveys and questionnaires were systematically administered to e-CRM managers and professionals within three SMEs, each representing a distinct industry. The execution of this data collection process adhered to a structured methodology, encompassing six key steps outlined below [35]:

### **Step 1: Specify the population and select a sample**

This approach involved specifying the population as e-CRM professionals and selecting a sample from these three SMEs, providing a diverse representation across different business sectors.

### **Step 2: Choose the survey type**

Surveys and questionnaires were administered specifically to e-CRM managers and professionals within three SMEs, each operating in distinct industries. This strategic choice of survey type allowed for a targeted exploration of insights within the context of e-CRM practices across various business sectors.

### **Step 3: Develop the survey questions**

In crafting the survey for e-CRM managers and professionals, a deliberate strategy was employed to incorporate both closed and open-ended inquiries. Closed-ended queries, featuring a list of predefined options with multiple answers, were employed to facilitate quantitative research. This method allows for the collection of numerical data, which can be subjected to statistical analysis to uncover patterns, trends, and correlations within the realm of e-CRM practices.

Simultaneously, recognizing the value of tapping into the specialized knowledge of these targeted professionals, open-ended queries were incorporated into the survey. This approach served as a powerful tool for engaging the participants on a qualitative level, eliciting detailed

responses that contribute to a comprehensive and nuanced understanding of the e-CRM field. By blending closed-ended queries for quantitative insights and open-ended queries for qualitative depth, the survey aimed to capture a holistic view of the experiences, challenges, and innovative perspectives within the e-CRM domain.

#### **Step 4: Disperse the survey and gather the responses**

Closed-ended query surveys and questionnaires were distributed to e-CRM managers and professionals through email communication. This method involved sending a set of predefined questions with a list of response options to gather quantitative data and insights related to their roles, experiences, and perspectives in the field of e-CRM.

While the open-ended queries were administered through one-on-one, in-person interactions with e-CRM managers. This approach allowed for a more qualitative exploration, providing a platform for these targeted professionals to express their thoughts, share detailed insights, and elaborate on their experiences in a face-to-face setting. The open-ended queries aimed to tap into the specialized knowledge of the participants, offering a deeper and more nuanced understanding of their perspectives on e-CRM practices. This combination of closed-ended surveys and open-ended in-person interviews sought to capture a comprehensive view of both quantitative data and qualitative insights within the context of e-CRM management.

### **Step 5: Examine the findings from the survey**

Various approaches were used for scrutinizing the outcomes of surveys and questionnaires conducted with e-CRM managers and professionals from three SMEs, each representing a distinct industry. Initially, the data must undergo processing, typically facilitated by computer programs to organize and categorize all the collected responses. It is imperative to ensure data integrity by eliminating incomplete or inaccurately filled-out responses.

In instances where open-ended questions were posed, a subsequent step involves coding the responses. This entails assigning labels to each response and structuring them into categories or themes. Employing more qualitative methodologies, such as thematic analysis, proves particularly beneficial for scrutinizing responses obtained through interviews.

### **Step 6: Compose a report on the survey findings**

In this dissertation, comprehensive data collected for the study has been meticulously presented through the use of graphs. Furthermore, detailed explanations accompany these graphical representations, providing a thorough and clear elucidation of the presented data. The integration of visual elements like graphs enhances the overall presentation, facilitating a more accessible and insightful understanding of the research findings.

The sample of questionnaire surveys conducted with e-CRM managers and professionals from three SMEs (representing three different industries) is as follows:

**Table 3-1: Sample Questionnaire**

<h3>Questionnaires on e-CRM and Web Analytics</h3> <p>This survey aims to gather insights into the intersection of e-CRM and web analytics. The data collected will be used to understand how organizations utilize web analytics data in their e-CRM strategies and identify the challenges they face. Your participation in this survey is greatly appreciated.</p> <p><b>Note:</b> Kindly provide your responses based on your knowledge and personal experiences.</p>
<ol style="list-style-type: none"><li>1. Details about the organization:<ol style="list-style-type: none"><li>a. What is the name of your organization?</li><li>b. Which industry does your organization belong to?</li></ol></li> <li>2. Utilization of Web Analytics:<ol style="list-style-type: none"><li>a. Does your organization utilize web analytics data in its e-CRM strategy?<ol style="list-style-type: none"><li>○ Yes, it does</li><li>○ No, it does not</li></ol></li><li>b. If yes, kindly provide details of the type used (e.g., Google Analytics, Adobe Analytics, etc.)</li></ol></li> <li>3. Integration of Web Analytics and e-CRM:<ol style="list-style-type: none"><li>a. How do you integrate web analytics data into your e-CRM systems? (Select all that apply)<ol style="list-style-type: none"><li>○ Mapping web analytics metrics to e-CRM goals and objectives</li><li>○ Tracking customer behaviour on the website to personalize interactions</li><li>○ Segmenting customers based on web analytics data</li><li>○ Using web analytics data to target specific customer segments with personalized offers</li><li>○ Other (Specify, if applicable)</li></ol></li></ol></li></ol>



b. How impactful do you perceive the integration of web analytics and e-CRM to be in improving customer understanding and engagement?

- Highly impactful
- Moderately impactful
- Neutral
- Less impactful
- Not impactful

4. Web Analytics Metrics for e-CRM:

a. Which web analytics metrics do you find most valuable for enhancing your e-CRM strategies? (Select all that apply)

- Website traffic and page views
- Conversion rates
- Bounce rate
- Average session duration
- Cost spent to acquire new customers
- The mean revenue generated by a customer throughout their entire association with a company.
- Customer engagement metrics (e.g., time spent on site, click-through rates)
- Other (Specify, if applicable)

5. Challenges:

a. What are the major challenges your organization faces in integrating web analytics and e-CRM? (Select all that apply)

- Data integration and compatibility issues
- Lack of expertise in analysing web analytics data
- Insufficient resources (financial, human, technological) for implementing integration
- Difficulty in defining meaningful KPIs and metrics
- Privacy and data security concerns
- Other (Kindly provide specific details)

6. Any additional remarks or comments:

Please share other comments, perspectives, or opinions you may have regarding the convergence of e-CRM and web analytics.

7. Demographic Information:

- a. What is your role within the organization?
- b. How many years of experience do you have in e-CRM or web analytics?

Thank you for taking part in this survey. Your responses will help enhance our understanding of the integration of web analytics and e-CRM.

### 3.3 Interviews and Focus Groups

During this study, interviews were also conducted with e-CRM managers and Consideration for Validity and Reliability professionals from three SMEs (represented three different industries). The sample interview is as below:

**Table 3-2: Sample Interview Questions**

#### **Interview Questions on e-CRM and Web Analytics**

This interview aims to obtain valuable information about the point where e-CRM and web analytics converge. The information collected will help understand how organizations leverage web analytics data in their e-CRM strategies and identify the challenges they face. Your participation is greatly appreciated.

**Note:** All responses will be maintained in privacy for research purposes.

1. Introduction and Background:

- a. Can you please introduce yourself and provide a brief overview of your role within the organization?
- b. How long has your organization been implementing e-CRM strategies?
- c. Could you describe the current e-CRM system or platform used in your organization?

2. Integration of Web Analytics and e-CRM:

- a. How does your organization integrate web analytics data into your e-CRM systems? Please explain the process or steps involved.

- b. What are the main benefits or advantages of integrating web analytics and e-CRM in your organization?
  - c. Can you provide examples of how web analytics data has been utilized to enhance customer understanding and engagement in your e-CRM initiatives?
3. Key Metrics and Indicators:
- a. Which web analytics metrics or indicators do you find most valuable for enhancing your e-CRM strategies? Why are these metrics important?
  - b. How do you use these metrics to measure the effectiveness of your e-CRM initiatives or campaigns?
  - c. Are there any specific challenges or limitations in using web analytics metrics for e-CRM decision-making? If so, please explain.
4. Challenges and Barriers:
- a. What are the major challenges or barriers your organization faces in integrating web analytics and e-CRM?
  - b. How do you address these challenges or overcome these barriers?
  - c. Have there been any instances where the integration of web analytics and e-CRM has faced resistance within your organization? If so, what were the reasons behind this resistance?
5. Best Practices and Recommendations:
- a. Based on your experience, what are some best practices or recommendations for organizations looking to integrate web analytics and e-CRM effectively?
  - b. Are there any specific tools, technologies, or strategies that you would recommend for optimizing the integration of web analytics and e-CRM?
6. Future Outlook:
- a. How do you see the intersection of e-CRM and web analytics evolving in the future? Do you anticipate any emerging trends or developments in this area?
  - b. Are there any areas of improvement or further exploration that you believe would benefit the integration of web analytics and e-CRM?
  - c. Is there anything else you would like to add or any additional insights you would like to share regarding the intersection of e-CRM and web analytics?

Thank you for your participation and valuable insights. Your responses will help enhance our understanding of the integration of web analytics and e-CRM in organizations.

**Note:** Follow-up questions and probes can be used to delve deeper into specific responses and gather more detailed information.

### 3.4 Sample Selection and Participants

Purposive sampling (selecting participants who meet specific criteria) [36] and snowball sampling (asking participants to recommend other individuals who might be suitable for the study) in selecting participants for the study on the intersection of e-CRM and web analytics as it is essential to target individuals who possess relevant knowledge and experience in both areas [37]. Criteria for participant selection are as follows:

- a. **Job Role:** Look for participants who hold key positions in e-CRM or web analytics within their organizations. This may include e-CRM managers, web analytics specialists, marketing managers, customer relationship managers, or data analysts.
- b. **Industry Diversity:** Ensure representation from various industries to capture a broader perspective on how e-CRM and web analytics intersect in different organizational contexts. Consider industries such as food & beverages, education and e-commerce.
- c. **Organization Size:** Include participants from organizations of varying sizes, spanning from small enterprises to larger corporations. This will help identify potential variations in the implementation and utilization of e-CRM and web analytics based on resource availability and organizational structures.

- d. **Experience Level:** Select participants with varying levels of experience in e-CRM and web analytics. This can include individuals with extensive experience in both areas as well as those who are relatively new to these domains. Experience levels can provide insights into different stages of implementation and maturity in integrating e-CRM and web analytics.
- e. **Organizational Maturity:** Consider organizations at different stages of e-CRM and web analytics implementation. This can include organizations that are just beginning to integrate these areas or those that have well-established processes and practices. Variations in organizational maturity can provide a comprehensive understanding of challenges and benefits across different implementation stages.
- f. **Collaboration:** If feasible, consider involving participants from both e-CRM and web analytics teams within the same organization. This can facilitate a deeper exploration of collaboration and communication between these teams and shed light on potential synergies and challenges faced during integration.

### 3.5 Data Analysis Techniques

Analysing the data collected from the intersection of e-CRM and web analytics study requires a combination of qualitative and quantitative techniques. The following are some data analysis techniques that can be employed:

### 3.5.1. Qualitative Analysis

Qualitative analysis is pivotal in understanding the complexities and nuances of the intersection between e-CRM and web analytics. The following is how thematic analysis is applied to interview data to extract meaningful insights:

**a. Data Preparation:**

Transcribe the interviews, ensuring accurate representation of participants' responses. Organize the interview transcripts in a systematic and accessible manner.

**b. Familiarization:**

Read through the transcripts to gain a holistic understanding of the data. Highlight or make notes on interesting or relevant segments. Generate initial ideas or impressions about emerging themes.

**c. Coding:**

Develop a coding framework based on the research objectives and interview questions. By assigning labels or codes to segments of the transcripts, the data can be coded based on specific themes or concepts. Be open to new themes that may emerge during the coding process and revise the coding framework accordingly.

**d. Iterative Coding and Theme Refinement:**

Continuously review and refine the coding framework as new themes or sub-themes emerge. Compare and contrast coded segments across different interviews to ensure consistency and

accuracy. Group related codes into broader themes, creating a hierarchy of themes and sub-themes. Document definitions and examples for each theme to ensure consistency during analysis.

**e. Theme Development:**

Review the coded segments within each theme and identify key patterns, connections, and variations. Look for supporting evidence or conflicting perspectives within the data. Generate descriptive summaries or narratives for each theme, capturing the essence of participants' perspectives.

**f. Interpretation and Synthesis:**

Analyse the relationships and connections between themes. Seek to identify overarching patterns, insights, or theoretical propositions that emerge from the data. Compare and contrast findings with existing literature or theoretical frameworks. Use participant quotes or excerpts as supporting evidence to enrich the analysis and enhance its credibility.

**g. Report Writing:**

Summarize the main findings from the qualitative analysis, emphasizing the identified themes and their implications. Provide illustrative examples or quotes to support the key findings. Consider integrating quantitative data or other relevant sources to offer a thorough comprehension of the convergence between e-CRM and web analytics. Interpret the findings in light of the research objectives and conclude the integration of e-CRM and web analytics based on the qualitative analysis.

### 3.5.2. Quantitative Analysis

Quantitative analysis allows for the systematic examination and interpretation of numerical data collected through surveys, questionnaires, or structured data. The following is how quantitative analysis is applied to analyse survey data on the intersection of e-CRM and web analytics:

#### a. Data Cleaning and Preparation:

Review the survey responses for completeness, accuracy, and consistency. Clean the data by removing any incomplete or invalid responses. Assign numerical codes to categorical responses for ease of analysis.

#### b. Descriptive Statistics:

Calculate frequencies and percentages for each survey question to understand the distribution of responses. Compute average of a set of values (e.g., geometric mean) and measures the extent to which data points in a dataset deviate from the average (e.g., coefficient of variation) for pertinent quantitative variables. Generate graphical representations, such as bar charts or pie charts, to visually display the distribution of responses.

#### c. Comparative Analysis:

Conduct subgroup analysis by comparing responses across different segments, such as industry, organization size, or experience level. Use cross-tabulations or chi-square tests to examine associations between categorical variables. Apply t-



tests or analysis of variance (ANOVA) to identify significant differences in mean responses across groups.

**d. Correlation Analysis:**

Determine the relationship between variables of interest, such as the relationship between web analytics metrics and e-CRM performance. Calculate correlation coefficients (e.g., Pearson's correlation coefficient) to assess the strength and direction of relationships. Use scatterplots or correlation matrices to visualize the relationships between variables.

**e. Inferential Statistics:**

Apply statistical tests to determine the significance of findings and draw conclusions about the population. Conduct hypothesis tests, such as t-tests or ANOVA, to assess significant differences between groups. Use regression analysis to examine the relationship between predictor variables (e.g., web analytics metrics) and outcome variables (e.g., e-CRM performance).

**f. Integration with Qualitative research methods:**

Analyse and juxtapose quantitative findings with qualitative findings to obtain a thorough comprehension of the intersection of e-CRM and web analytics. Use qualitative data to provide context, enrich interpretations, or validate quantitative findings.

**g. Report Writing:**

Summarize the main findings from the quantitative analysis, highlighting significant trends, associations, or differences. Provide numerical results, such as mean values, percentages, or

correlation coefficients, to support the key findings. Interpret the results in correlation with the study's objectives and conclude the integration of e-CRM and web analytics based on the quantitative analysis. Consider limitations, such as sample size or response bias, and discuss their implications for the findings.

### **3.6 Ethical Considerations**

Research involving the intersection of e-CRM and web analytics adheres to ethical guidelines to protect the rights and well-being of participants and ensure the integrity of the research process. The subsequent is the ethical considerations during the research:

#### **a. Consent through informed understanding:**

Ensure that participants provide informed consent by clearly communicating the study's purpose, and procedures, as well as the potential risks and benefits involved. Make sure that participants grasp their rights, encompassing the optional nature of engagement, the freedom to withdraw at any point, and the confidentiality of their answers. Provide contact information for the researcher or research team should participants have any questions or concerns.

#### **b. Anonymity and Confidentiality:**

Guarantee the confidentiality and anonymity of participants by removing any identifying information from the collected data. Store data securely and restrict access to authorized personnel only. Use pseudonyms or participant codes to maintain

confidentiality when reporting findings. Communicate how data will be stored, protected, and used in any consent or information forms.

**c. Data Privacy and Security:**

Comply with relevant data protection regulations, such as the General Data Protection Regulation (GDPR), Health Insurance Portability and Accountability Act (HIPAA) or Personal Data Protection Act (PDPA), depending on the jurisdiction and nature of the study. Safeguard personal and sensitive data by using secure data storage and transmission methods. Obtain necessary permissions and approvals when accessing and analysing web analytics data, ensuring compliance with terms of service and privacy policies.

**d. Voluntary Participation and Withdrawal:**

Emphasize the voluntary nature of participation, ensuring that participants are not coerced or unduly influenced to take part in the study. Allow participants the option to withdraw their participation at any stage without consequences or penalties.

**e. Transparent Research Practices:**

Provide clear and transparent information about the research purpose, methods, and intended outcomes. Clearly state any potential conflicts of interest or affiliations that may impact the research process or findings.

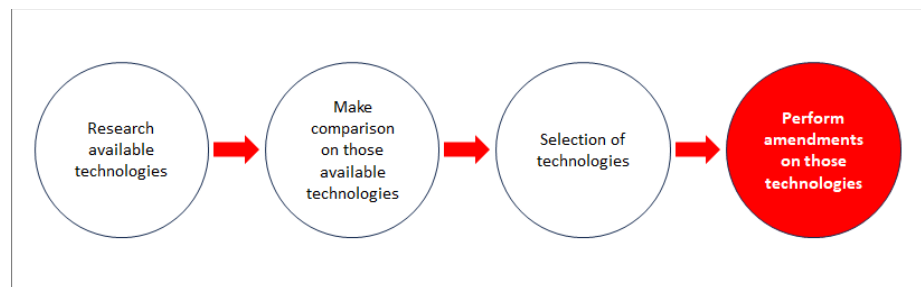
**f. Research Ethics Review:**

Seek ethical approval from relevant ethics oversight committees or institutional review panels before undertaking the study, if required. Comply with the ethical guidelines and regulations set forth by the institution or professional bodies.

**g. Reporting and Dissemination:**

Ensure that research findings are reported accurately and honestly, avoiding any misrepresentation or manipulation of data. Safeguard the confidentiality of participants when disseminating research results by avoiding the use of personally identifiable information.

**3.7 Selection of Technologies**



**Figure 3-1:** Technologies selection flow

**Figure 3-1** illustrates the process that took place in the selection of technologies. Selection of a web analytics and e-CRM solution, required consideration of the intersection of e-CRM and web analytics to ensure that the chosen platform meets the objective of this dissertation. **Table 3-3** demonstrates the factors in considering the chosen technologies:

**Table 3-3: Factors involves in technologies selection**

<b>No</b>	<b>Factors</b>	<b>Description</b>
1	Defining Requirements	Determine what specific features and functionalities that are crucial for the research such as data collection, segmentation, reporting, integration capabilities, campaign management, personalization, customer support, and scalability.
2	Evaluate Integration Capabilities	Look for a solution that seamlessly integrates web analytics and CRM functionalities. It should allow for the exchange of information seamlessly between the two systems, offering a comprehensive perspective on customer engagements.
3	Data Collection and Analysis	Analysing customer data is vital for effective e-CRM and web analytics. Evaluation of the platform's data collection methods, including its ability to track and analyse website traffic, customer behaviour, conversions, and campaign performance.
4	Assess Reporting and Visualization Capabilities	Effective reporting and visualization features help to derive insights and make informed decisions. The platform's reporting capabilities, including the availability of customizable dashboards, real-time reporting, visualization options, and the ability to create comprehensive reports for different stakeholders are considered.

No	Factors	Description
5	Scalability and Flexibility	Ensuring that the chosen solution can scale with the business and accommodate future growth. It should be flexible enough to adapt to the evolving needs and support additional features, integrations, and customization options.
6	User-friendliness	Assess the user interface and usability of the platform. An intuitive interface can decrease the learning curve and facilitate efficient utilization of the system by team members.
7	Cost and Return-on-Investment	Evaluating the cost of the solution about its features and benefits. Consider the potential return on investment (ROI) and how well the platform aligns with the budget and long-term business goals.
8	Reputation and Customer Reviews	Research involves studying the reputation of the technologies, and reading customer reviews and testimonials. This gives insights into the experiences of other users and helps in making an informed decision.

### 3.8 Selection of Web Analytic

This dissertation compares the ten most popular web analytics. The popularity of web analytics is based on an assessment done on the five million most visited websites in the world to find out the web analytics tool that they are using [38]. The ten web analytics tools are Google Analytics (used by 1,409,266 websites), Hotjar (used by 106,379 websites), Google Analytics Enhanced eCommerce (used by 101.763 websites), Matomo Analytics (used by 71,128 websites), Yandex. Metrica (used by 69,625 websites), New Relic (used by 53,446

websites), Track.Js (used by 51,888 websites), Liveinternet (used by 49,615 websites), comScore (used by 29,124 websites) and Quantcast Measure (used by 27,931 websites). Upon going through to find the most suitable base on the factors listed in **Table 3-3**, it is found that Matomo analytics fits the factor the most as explained in **Table 3-4** below:

**Table 3-4:** Reasons of selecting Matomo Analytics

No	Reasons	Descriptions
1	Data Ownership and Privacy	Matomo allows users to have full control over their data. Unlike the other nine analytics tools that store data on external servers, Matomo can be self-hosted, enabling users to keep their data on their servers and ensuring data privacy and compliance with regulations like the General Personal Data Protection Act (PDPA)
2	Open-Source Flexibility	Matomo is an open-source platform, which means that its source code is freely available for users to review, modify, and customize. This gives users greater flexibility in adapting the tool to their specific needs and integrating it with other systems.
3	Customizability	Matomo offers extensive customization options. Users can create custom reports, define custom dimensions and metrics, and set up custom tracking goals to measure specific user actions that are unique to their website or business.
4	Real-time data analysis	Matomo provides immediate data analysis, allowing users to keep tabs on visitor activity and behaviour on their websites as it happens. This is particularly beneficial for websites that require immediate insights and quick decision-making.

No	Reasons	Descriptions
5	Advanced segmentation	Matomo offers advanced segmentation capabilities, allowing users to categorize their website visitors according to different factors like demographics, behaviour, and traffic sources. This helps in gaining deeper insights into specific user groups and tailoring marketing efforts accordingly.
6	No data sampling	Matomo does not employ data sampling techniques, which means that users can access and analyse their complete dataset without losing granularity or accuracy, even with high-traffic websites.

Matomo Analytics has some disadvantages too where some basic features need to be subscribed but they can be ignored since they do not apply to this research and it also requires some technical knowledge to set it up.

### 3.9 Selection of e-CRM

The research for this dissertation set out to find the available e-CRM technologies that can be integrated with WordPress particularly WooCommerce which provides drip campaigns. Eight such technologies are found in the following table (**Table 3-5**):

**Table 3-5:** List of e-CRM with Drip Campaign Features

No	e-CRM Name	Cost
1	HubSpot CRM with HubSpot Marketing Hub	Not Free
2	ActiveCampaign	Not Free
3	MailChimp	Not Free
4	GetResponse - <i>30,000 Application Programming Interface (API) calls within each time frame of 10 minutes and allows for 80 API calls per second.</i>	FREE
5	Infusionsoft by Keap	Not Free
6	Sendinblue	Not Free
7	Autopilot	Not Free
8	ConverKit	Not Free

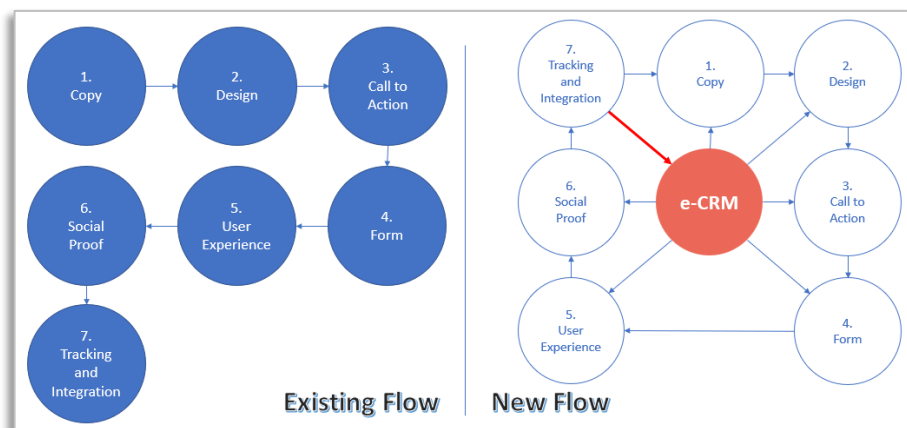


However, none of the above provides full control over the collected data and they do not provide integration with Matomo Analytics. In short, based on this research up to this point, it shows that currently, no existing technology provides integration of web analytics with e-CRM. That is what this dissertation is striving to do, to integrate web analytics with e-CRM to prove that through that integration it will be more effective for the SMEs in Malaysia. Therefore, an e-CRM will be developed using PHP language for this research.

### 3.10 Integration Plans

#### 3.10.1. Improving Existing Marketing Campaign Flow

The integration of web analytics with e-CRM is measured based on how they improve the customers' experiences and business sales. The implementation of the model is illustrated in the diagram below.



**Figure 3-2:** Existing Marketing Campaign Flow vs. New Flow

The integration plan for combining web analytics with e-CRM involves multiple essential steps that aim to enhance the marketing flow and

improve customer engagement. **Figure 3-2** illustrates the implementation of web analytics in step seven of the marketing process, where it provides real-time insights into the e-CRM system. This integration represents a significant improvement as existing technologies typically lack this capability.

Web analytics will track and record various customer actions, such as the marketing campaigns they originate from, the landing pages they visit, the extent to which they engage with the landing page content, and whether they complete the viewing of marketing videos or all the available videos. These tracked actions will be fed back into the e-CRM system, enabling it to assign scores based on predefined criteria within the drip campaign. Leveraging these scores, the drip campaign can then guide customers towards landing pages that align with their browsing behaviour while sending relevant messages through channels like email, WhatsApp messenger, or popup notifications to registered customers.

This integration represents the second improvement introduced in this dissertation. Unlike conventional drip campaigns, which primarily rely on automated email sequences, this research demonstrates the effectiveness of engaging customers through multiple channels. By extending the drip campaign's reach beyond email and incorporating other communication channels, such as WhatsApp or popup notifications, businesses can nurture leads, build relationships, and guide recipients through a more personalized and dynamic journey.

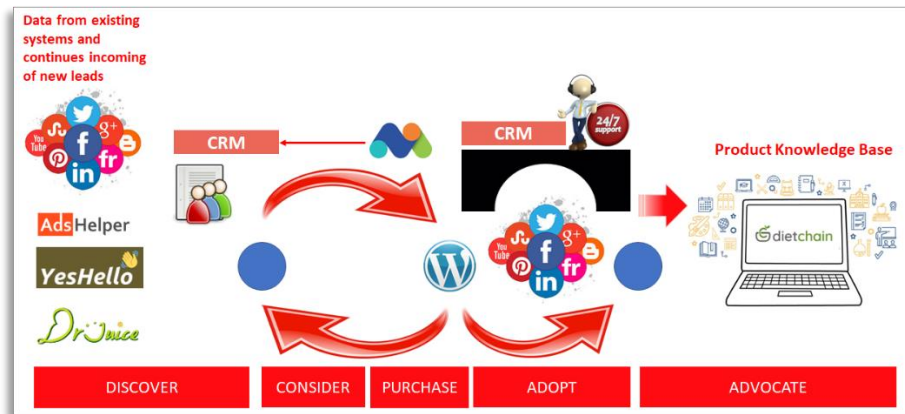
The real-time monitoring capabilities facilitated by this integration have proven to drive significant results in terms of conversions and sales. By continuously monitoring customer behaviour and engagement, SMEs can take almost immediate actions to optimize their strategies without interrupting ongoing marketing campaigns. This agility allows them to create more targeted content and offers on the fly, instead of waiting for end-of-campaign reports to identify areas for improvement.

Moreover, the combination of e-CRM with an enhanced drip campaign automates a significant portion of the customer engagement and re-engagement processes. This automation not only streamlines operations but also reduces costs, as SME personnel can focus their efforts on areas that require human intervention, such as developing innovative marketing strategies, fostering customer relationships, and providing personalized support.

Overall, integrating web analytics with e-CRM brings numerous advantages to businesses. It empowers them with real-time insights into customer behaviour, facilitates personalized and multi-channel communication, drives conversions and sales, and optimizes marketing strategies. This integration plan serves as a framework for implementing these improvements, and it is crucial to adapt it according to the specific requirements and capabilities of the existing systems and infrastructure within each organization. By carefully executing this integration plan,

businesses can leverage the power of web analytics and e-CRM to deliver exceptional customer experiences and drive sustainable growth.

### 3.10.2. System Integration of Web Analytics With E-CRM



**Figure 3-3:** Actual Implementation

**Figure 3-3** provides a visual representation of the practical implementation flow that supports the plan described in **Section 3.10.1**. This implementation involves the integration of an improvised drip campaign. To enhance the effectiveness of a drip campaign, an improvised approach can be implemented, involving the integration of a scoring system that assigns a unique website score to each visitor. This score allows for tracking and assessing the level of activity and engagement exhibited by visitors on the website. By assigning numerical values to various actions and parameters, such as viewing specific pages or engaging with certain content, the scoring system reflects the importance and significance of these actions. For instance, actions like making purchases or submitting forms may be assigned higher weights compared to simply browsing pages. The scoring system must

harmonize with the website's goals and objectives. This implementation not only benefits the e-CRM team but also empowers the sales personnel by enabling them to engage with prospects in a more targeted manner. For example, if one prospect has a website score of "20" while another has a score of "64," the latter prospect is deemed to have a higher potential for closing sales.

Once the data is collected, it is imperative to conduct a thorough analysis to uncover meaningful patterns, trends, and correlations that can inform the strategy of the drip campaign. This analysis aims to segment the audience based on the insights derived from the data, allowing for the creation of tailored messages that cater to the distinct requirements and interests of every segment. By crafting content that resonates with each group and incorporating personalized recommendations based on their past purchases or pain points, the drip campaign becomes more relevant and engaging.

Continual monitoring and analysis of the campaign's performance using data analytics are essential. Tracking important measurements like click-through rates, open rates, conversion rates, and consumer interaction yields valuable insights of the efficacy of various messages, categories, and timing. Through utilizing these understandings, the campaign can be enhanced and optimized progressively. Data-driven adjustments can be made to improve overall performance, ensuring that

the campaign remains aligned with the evolving preferences and behaviours of the target audience.

The initiation of the drip campaign in the e-CRM system marks the beginning of the workflow. This entails configuring the necessary parameters and settings to establish the campaign within the system, ensuring its smooth operation. Simultaneously, the existing data, comprising valuable customer information, is carefully imported into the e-CRM platform. This meticulous process ensures that all the essential details required for analysis and effective customer engagement are readily available.

Once the preparatory steps have been completed, the next phase commences with the deployment of the initial round of emails as an integral part of the drip campaign. These carefully crafted emails are strategically designed to capture the recipients' attention, provide relevant information, and encourage their continued engagement. The content of these emails is tailored to align with the objectives of the campaign and the specific needs and interests of the target audience.

By strategically timing the delivery of these emails, the drip campaign aims to establish a consistent and meaningful communication flow with the customers. The intervals between successive emails are carefully planned to ensure optimal engagement without overwhelming the recipients. This gradual and well-paced approach allows for a systematic

nurturing of leads, fostering a stronger relationship and increasing the likelihood of desired customer actions, like completing a purchase or subscribing to a service, or responding to a call-to-action.

Throughout the execution of the drip campaign, continuous monitoring and analysis are conducted to evaluate its effectiveness. Crucial metrics like click-through rates, open rates, and conversion rates, are meticulously tracked to gauge customer engagement and to make informed decisions regarding the campaign's progress. The web analytics tool provides real-time feedback on these activities, which is then fed back into the e-CRM system. This data-driven approach enables ongoing optimization and refinement of the campaign, ensuring its alignment with the evolving needs and preferences of the customer base.

Leveraging real-time insights obtained from the web analytics tool, the e-CRM system can effectively respond to customer behaviour by implementing appropriate actions. When customers complete a purchase, the e-CRM system can initiate re-engagement strategies to further enhance their experience and foster repeat business. These strategies encompass a range of personalized approaches, such as sending tailored follow-up emails, providing customized product recommendations, or presenting exclusive incentives aimed at strengthening customer relationships.

Conversely, when customers abandon their shopping carts or display a lack of engagement, the e-CRM system can promptly launch targeted efforts to nurture and regain their interest. These engagement activities encompass various tactics designed to re-engage customers and reignite their enthusiasm. For instance, the system may send reminder emails, offer supplementary information or incentives, or propose alternative products or solutions based on their unique preferences and browsing history.

By leveraging the capabilities of the e-CRM system in response to real-time web analytics insights, businesses can effectively personalize their approach and maximize customer engagement. This proactive methodology allows for the implementation of tailored strategies to retain satisfied customers, as well as re-engage those who require additional attention. Ultimately, by responding appropriately to customer behaviour, organizations can cultivate stronger relationships, boost customer satisfaction, and drive long-term loyalty.

At the same time, social media platforms serve as the backdrop for a multitude of ongoing marketing campaigns. To assess the efficacy of these campaigns, the web analytics tool comes into play by monitoring distinct codes assigned to each marketing endeavour across various social media platforms. This tracking mechanism is immensely valuable as it allows SMEs to collect crucial data regarding the performance and results of their marketing endeavours. Examining click-through rates,



engagement levels and conversion rates, besides other relevant metrics linked to each distinct code, SMEs gain the insights needed to make informed decisions regarding the allocation of their marketing budget.

The acquired data serves as a compass for SMEs, pointing them in the right direction when assessing the efficacy of their marketing efforts. Through careful analysis, SMEs can determine which social media platforms yield the highest Return on Investment (ROI). By scrutinizing the click-through rates, engagement levels and conversion rates associated with each unique code, SMEs gain valuable knowledge regarding the success of their campaigns on different platforms. This information allows for the identification of the most fruitful avenues for marketing endeavours, enabling SMEs to focus their resources and efforts on channels that generate the greatest results.

Moreover, the data obtained through the web analytics tool helps SMEs identify areas that require improvement or warrant discontinuation. By closely examining the metrics associated with each unique code, SMEs can pinpoint underperforming marketing channels. This insight empowers SMEs to make strategic decisions regarding the optimization of their marketing strategies. For instance, if a particular social media platform consistently shows low engagement levels and minimal conversion rates, SMEs can reallocate their marketing budget to more effective channels or explore alternative strategies to boost performance. The ability to discern underperforming campaigns allows SMEs to

adjust their marketing tactics, refine their approach, and ensure that their resources are utilized efficiently.

Furthermore, the analysis of web analytics data offers SMEs a comprehensive view of their marketing landscape. Armed with this knowledge, they can make data-driven decisions regarding the allocation of their marketing budget. By identifying the social media platforms that yield the highest ROI and determining which campaigns are generating the most engagement and conversions, SMEs can strategically invest their marketing resources to maximize their impact. This intelligent allocation of funds ensures that SMEs optimize their marketing budget and achieve the best possible outcomes.

The amalgamation of web analytics and e-CRM presents numerous advantages for SMEs. By combining these two powerful tools, SMEs can capture and analyse customer behaviour within the e-CRM system while simultaneously tracking their interactions through the web analytics tool. This integration provides SMEs with invaluable insights into customer preferences, interests, and patterns of engagement. Armed with this information, SMEs can develop highly targeted and personalized marketing strategies, optimize the customer journey, and ultimately increase conversions and drive sales.

A significant advantage of merging web analytics with e-CRM is the capability to collect extensive information on customer actions. The e-

CRM system acts as a repository for customer information, storing valuable information like demographic details, buying history, and contact information. By integrating this customer data with web analytics, SMEs can acquire a more profound comprehension of which pages customers visit, the duration of their stay, and the actions they take. This granular level of insight allows SMEs to uncover patterns and trends in customer behaviour, identify areas of interest or concern, and utilize data-driven insights for enhancing their marketing approaches.

Furthermore, the integration of web analytics and e-CRM empowers SMEs to personalize their marketing efforts. By analysing customer behaviour and preferences, SMEs can segment their customer base and provide precise and tailored messages. For example, based on web analytics data, SMEs can identify customers displaying interest in a particular product category and use this information to create personalized email campaigns showcasing related products or offering tailored promotions. This degree of customization improves the customer experience and boosts engagement, and boosts the probability of conversions.

Optimizing the customer journey is another significant advantage of integrating web analytics with e-CRM. By tracking customer interactions across various touchpoints, SMEs can identify bottlenecks or areas where customers drop off, allowing them to take proactive measures to improve the customer journey. For instance, if web analytics

data reveals a high bounce rate on a particular page, SMEs can analyse the page design, content, or user experience to identify areas for improvement. This continuous optimization of the customer journey based on web analytics insights ensures a seamless and enjoyable experience for customers, increasing their satisfaction and likelihood of completing desired actions.

Ultimately, the integration of web analytics and e-CRM drives conversions and sales for SMEs. By leveraging the insights gained from customer behaviour analysis, SMEs can refine their marketing strategies, improve targeting, and enhance the overall customer experience. As a result, this leads to enhanced engagement, heightened conversions, and ultimately increased sales. The integration of web analytics and e-CRM empowers SMEs to make informed decisions based on data, optimize their marketing endeavours, and accomplish their business objectives.

The real-time feedback provided by the web analytics tool empowers SMEs to respond promptly to customer actions and tailor their engagement efforts accordingly. Whether it is re-engaging with customers who have shown interest or providing additional support to customers who require assistance, the e-CRM system can adapt its approach based on the real-time insights received.

Furthermore, the integration of web analytics and e-CRM allows SMEs to evaluate the impact of their marketing campaigns on various social media platforms. By assigning unique codes to each campaign and tracking their performance through the web analytics tool, SMEs can evaluate the efficacy of their marketing initiatives and make data-informed decisions regarding the allocation of their marketing budget. They can identify the social media platforms that yield the highest engagement and conversion rates, enabling them to focus their resources and efforts on the most effective channels while optimizing their overall marketing strategy.

It is crucial to emphasize that the success of the integration relies on appropriate configuration and setup of both the e-CRM system and the web analytics tool. The e-CRM system must be customized to capture and analyse relevant customer data, such as email opens, clicks, website visits, and purchase behaviour. Additionally, the web analytics tool should be configured to track and provide detailed insights into customer interactions on the website or landing pages, including click-through rates, page views and conversion rates.

The integration of web analytics with e-CRM offers SMEs a comprehensive solution to optimize their marketing efforts, enhance customer engagement, and drive conversions and sales. By leveraging real-time insights into customer behaviour and preferences, SMEs can personalize their communication, deliver relevant content and offers,

and effectively re-engage customers who have shown interest. The integration also enables SMEs to evaluate the performance of their marketing campaigns on social media platforms, allowing for data-driven decision-making and improved allocation of marketing resources. When executed effectively, this integration can lead to enhanced customer experiences, increased customer loyalty, and sustainable business growth.

The majority of web analytics tools have limitations when it comes to providing detailed information about the specific individuals they are tracking. While they can track user entries, they often fall short of identifying the exact identities of the users. Typically, these tools rely on tracking methods such as IP addresses, cookies, and User-Agent data.

However, these tracking methods have their limitations and challenges. Tracking through IP addresses can be problematic due to dynamic IP assignments by internet service providers. This implies that the IP address linked to a user can change over time, making it difficult to accurately link specific activities to individual users. Additionally, in cases where multiple users share the same IP address, such as in large organizations or public Wireless Fidelity (Wi-Fi) networks, distinguishing between different users becomes challenging.

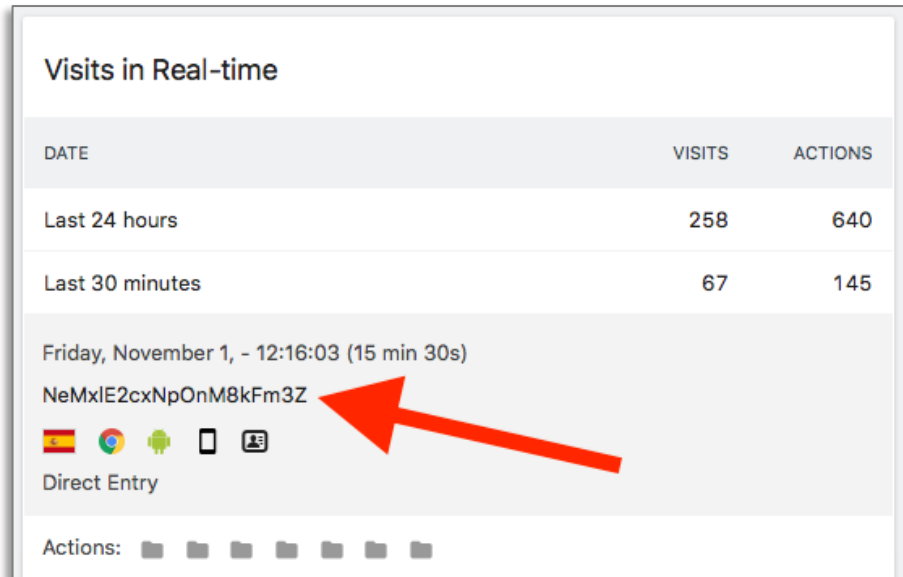
Cookie tracking is another commonly used method, but it has its drawbacks as well. Users have the option to delete cookies from their

browsers, which can disrupt the tracking process. When cookies are deleted, the web analytics tool loses the ability to recognize the user and track their activities accurately. Moreover, some users choose to block or disable cookies altogether, preventing the web analytics tool from gathering any information about their browsing behaviour. This significantly limits the effectiveness of cookie-based tracking methods. The summary of those challenges is outlined in **Table 3-6**, below:

**Table 3-6:** Challenges faced by the common tracking methods.

No.	Methods	Challenges
1	IP Address	IP addresses can change dynamically, and multiple users can share the same IP address due to network configurations like NAT.
2	User-Agent	User-agent can be easily manipulated or spoofed
3	Cookies	Cookies can be cleared or disabled by the user, affecting the accuracy and persistence of the identifier.

The breakthrough made by this dissertation is, that it links Fingerprint's Visitor Identification (visitorID) with Matomo Visitor Identification (visitorID) using User Identification (userID) functionality (demonstrated in **Figure 3-4**).



**Figure 3-4:** A correctly configured Matomo instance with fingerprint

The generation of a visitorID using Fingerprint techniques involves collecting various data points from the visitor's browser and device and processing them to create a unique identifier. **Table 3-7** below provides an overview of how a visitorID is generated:

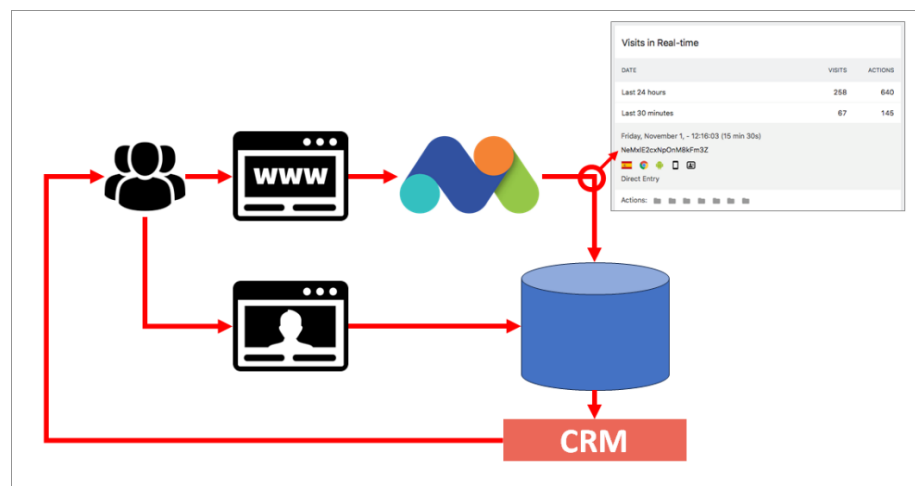
**Table 3-7:** Generation of visitorID.

Step	Activities	Description
1	Data Collection	When a visitor accesses a website, JavaScript code embedded on the webpage collects a range of information from the visitor's browser and device. This data typically includes user agent, screen resolution, installed fonts, enabled plugins, time zone and language preferences.



Step	Activities	Description
2	Data Processing	The collected data is processed and normalized to remove inconsistencies and standardize the information across different devices and browsers. This step involves filtering out irrelevant or volatile data points that may change frequently.
3	Hashing and Encoding	The processed data is combined and hashed using cryptographic algorithms like Secure Hash Algorithms-1 (SHA-1) for a unique fingerprint or Secure Hash Algorithms-256 (SHA-256) for heightened security. Hashing ensures a consistent and anonymized fingerprint, preventing reverse engineering. The resulting hashed fingerprint is then encoded into a format suitable for storage and transmission.
4	Visitor ID Creation	The hashed fingerprint is used as the basis for generating the visitor ID. This ID serves as a unique identifier for the visitor and is associated with their browsing session or activity. The visitor ID is typically stored on the server side or as a persistent cookie on the visitor's device, enabling the identification of returning visitors.

As shown in **Figure 3-5** below, by linking Fingerprint's visitorID with Matomo visitorID using userID functionality and stored in the database accessible by the e-CRM, this model is now able to link the registered customer with every action performed by that customer to the time when the customer first visited the website/ landing pages (before that customer register).



**Figure 3-5:** Methods on How Matomo Track every customer

## CHAPTER 4

### DATA-DRIVEN e-CRM MODEL

#### 4.0 Data-Driven E-CRM Model

Three SMEs were identified as the sites where the study will be conducted. The three sites were chosen due to the nature of their business which is very different (Food & Beverages, Education and E-Commerce Platform).

#### 4.1 Materials and Tools Utilized in the Study

##### 4.1.1. Samples

The sequential sampling technique is applied because it involves continuously collecting data from visitors as they arrive on those SMEs' websites. It is particularly useful to track and analyse website metrics in real time. With sequential sampling, trends can be monitored, patterns identified, and timely adjustments made to those websites based on the ongoing data collection process. Samples of data are coming from the following sources.:

##### a. Data from the website:

Data is collected through web analytics when users visit the site (which was then linked to e-CRM). Data is also collected when users interact with the website, making purchases and answering

surveys. Other than that, data is also collected when users are not responding to the emails and messages sent to them.

**b. Data from the campaigns:**

Codes are assigned to every campaign to track the popularity of the campaigns by customers.

**4.1.2. Chosen Sites**

As mentioned in **Section 4.0**, three SMEs that are selected come from different industries (Food & Beverages, Education and E-Commerce Platform). They are chosen because their target market’s demographic is very different as shown in **Table 4-1**.

**Table 4-1: Demographic by site**

No.	Industries	Demographic
1	Food & Beverages	<ul style="list-style-type: none"> <li>• Health-conscious community.</li> <li>• Only for members.</li> </ul>
2	Education	<ul style="list-style-type: none"> <li>• Students searching for schools.</li> <li>• Parents who are evaluating school for children.</li> </ul>
3	E-Commerce Platform	<ul style="list-style-type: none"> <li>• Consumers looking for “Best Deals”.</li> <li>• Various types of merchants.</li> </ul>

**4.1.3. Procedures**

**a) Design:**

This research is based on the hypothesis that everyone is looking for something and it is a matter of the right timing to present the right information, the way they can digest and be attracted to. Its meta-analysis demonstrates that integration of web analytics with e-CRM can provide a better-automated prediction of visitors’ and

customers' needs and that it has a positive impact on the business's operation and sales. The proposed model captures and responds automatically to users'/customers' interaction with the presented information by leading them to a presentation that suits their interest (**Section 5** will show the successes of doing so).

**b) Variables:**

Customer engagement refers to the level of interaction, involvement, and emotional connection between customers and a company or brand. It can be measured through various indicators, such as website visits, social media interactions, email open rates, and customer feedback. In the intersection of e-CRM and web analytics, customer engagement serves as a key variable to assess the effectiveness of e-CRM strategies and the impact of web analytics on enhancing customer interactions and relationships.

Customer engagement can be measured quantitatively through objective metrics, such as the number of website visits or social media interactions, or qualitatively through subjective measures, such as customer feedback or sentiment analysis of customer interactions. These measures can be obtained through web analytics, e-CRM, surveys, or social media listening tools.

Understanding and enhancing customer engagement is crucial in the context of e-CRM and web analytics as it directly influences

customer satisfaction, loyalty, and the overall success of customer-centric strategies. By analysing the relationship between e-CRM initiatives, web analytics data, and customer engagement, organizations can identify opportunities for improvement, tailor their marketing and customer experience efforts, and enhance customer relationships in the digital space.

The measurement variables will be presented in more detail in *Section 4.2*.

**c) Power and sample size:**

The sample sizes for each of the sites are different as explained in *Table 4-2*.

**Table 4-2: Justification of Sample Size**

No	Sites	Justification on Sample Size
1	Food & Beverages	<b>2019 – 2020</b> this period of sample is taken to evaluate the before and after implementation during Coronavirus disease (COVID-19).
2	E-Commerce Platform	<b>March 2021 – June 2021</b> during the sales campaign (to prove the findings from F&B)
3	Education	<b>August 2021 – October 2021</b> is the school intake campaign period (to confirm the findings from F&B and the e-commerce platform)

#### 4.1.4. Hardware and Software

**Table 4-3: List of Hardware and Software**

No	Tools	Usage
1	Various hosting was used including hosting service provided by AWS, Virtual Private Server (VPS) and Cloud-based Hosting	storing website files and data making the website available for users to visit and interact with.
2	Virtual machine software (VMWare)	Testing environment for advanced analytic tools and automated tools to be installed, explored, and modified before deploying them on live hosting servers or websites.
3	WordPress	A web development and construction tool utilized to provide support for partial systems.
4	Notepad ++	A tool employed in web development for coding purposes.
5	Visual Studio Code	A software tool utilized in the process of web development.
6	Cross-Platform, Apache, MySQL, PHP, and Perl (XAMPP)	A bundle of web server solutions designed to establish a local environment for testing websites, software, or systems before deployment on a live server.
7	Matomo	Open-source web analytics platform for tracking website visitor data.
8	Microsoft PowerPoint	To create online marketing content and graphics for campaigns like email marketing and social media promotion.
9	PhpMyAdmin	Facilitate database visualization, management, and CRUD operations (Create, Read, Update, Delete).
10	Vectr (Online)	A graphic design software utilized for crafting marketing posters.
11	Facebook	The primary online marketing platform for hosting live campaigns and scheduling marketing content.
12	Social Poster	Used for scheduling and automating social media posts while gathering analytics.
13	WordPress Email Subscriber	Initiate email marketing campaigns.
14	Facebook Sharing Debugger	Identify errors in shared Facebook posts.

#### 4.1.5. Programming and Common Language

**Table 4-4:** List of Languages for programming and executing commands

No	Language	Usage
1	Linux command	It is employed for the technical installation of advanced automation and analysis tools. It is also utilized to set up web stacks like Linux, Apache HTTP Server, MySQL, PHP (LAMP) or Linux, Nginx, MySQL, and PHP (LEMP).
2	SQL Command	It enables the execution of create, read, update, and delete (CRUD)PHP actions and facilitates the design, creation, and management of databases.
3	Hypertext Preprocessor (PHP)	It is utilized to construct systems, integrate code and programs between plugins and systems, and execute server-side actions.
4	HyperText Markup Language (HTML)	Markup language used for creating and structuring web pages and applications.
5	Cascading Style Sheets (CSS)	Style sheet language is used to enhance the presentation and visual appearance of web documents.
6	JavaScript, JQuery	It is used in building systems and websites, utilized in Asynchronous JavaScript And XML (AJAX), and facilitates code and program integration between plugins and systems.

#### 4.2 Measurement

The intersection of web analytics and e-CRM provides an opportunity to measure the results through various metrics. This study focuses on four specific areas of measurement: Website Traffic and User Behaviour, Personalization and Segmentation, ROI and Business Impact, and Integration and Data Exchange.



In the context of Website Traffic and User Behaviour, one of the fundamental measurements is Total website visits. This metric encompasses the overall traffic to the website, including the number of unique visitors and the total number of visits. It provides an overview of the website's popularity and the level of audience engagement. Another important metric is Page views, which tracks the number of times individual pages are viewed. By analysing page views, businesses can gain insights into which pages are the most popular or engaging to visitors. Additionally, bounce rate is a metric that calculates the proportion of visitors who exit the website after viewing just one page. A high bounce rate may suggest a deficiency in engagement or relevance of the website's content. Lastly, time on site is a metric that quantifies the average duration of visitors' engagement on the website. This metric provides valuable insights into visitors' degree of involvement and interest in the content on the website.

Personalization and Segmentation serve a pivotal role in augmenting the efficacy of e-CRM initiatives. Personalization metrics measure the impact of personalization strategies on important performance metrics like conversion rate, average order value, and customer contentment. By evaluating these indicators, businesses can gauge the impact of personalized experiences in driving desired outcomes. Furthermore, Segmentation analysis involves comparing the performance of different customer segments based on their behaviour, demographics, or other relevant attributes. This analysis enables businesses to understand how

well targeted and personalized e-CRM efforts perform for each segment, allowing for more effective and tailored marketing strategies.

ROI and Business Impact measurements are essential for assessing the effectiveness and value generated by e-CRM activities. Cost Per Acquisition (CPA) is a primary measure evaluating the expense incurred to acquire a customer through e-CRM activities. This metric takes into account various expenses related to software, advertising, and personnel. By calculating the CPA, businesses can evaluate the efficiency and cost-effectiveness of their customer acquisition efforts. Revenue attribution is another important metric that assesses the revenue generated directly or indirectly from e-CRM initiatives. This metric tracks the source of conversions and sales, enabling businesses to attribute revenue to specific e-CRM activities or campaigns. Additionally, customer satisfaction is measured through surveys or feedback mechanisms to understand the impact of e-CRM initiatives on customer perception, allegiance, and overall satisfaction. This metric provides valuable insights into the effectiveness of e-CRM strategies in nurturing positive customer experiences.

Integration and Data Exchange measurements are critical for ensuring seamless data flow and maximizing the benefits of integrating web analytics and e-CRM. Data accuracy and consistency are measured to evaluate the reliability and quality of data shared between the e-CRM and web analytics systems. Accurate and consistent data is essential for

generating reliable insights and supporting informed decision-making processes. Integration efficiency is another crucial metric that assesses the ease and efficiency of data exchange and integration between the e-CRM and web analytics platforms. Factors such as data latency or delays are considered to evaluate how effectively the systems work together and provide timely access to relevant data.

By measuring these indicators, businesses can acquire valuable understandings regarding the effectiveness of integrating web analytics and e-CRM. These measurements help in pinpointing areas for enhancement, fine-tune marketing approaches, and allocate resources efficiently, and deliver personalized experiences that drive customer satisfaction, conversions, and overall business growth. Understanding the impact of web analytics and e-CRM integration through these metrics empowers businesses to base decisions on data-driven insights and continuously enhance their digital marketing efforts.

### **4.3 Data Analysis**

Data analysis in the intersection of e-CRM and web analytics entails the procedure of examining and interpreting the data collected from both systems to gain insights and make informed decisions. It involves analysing the vast amount of data generated by e-CRM activities and web analytics tools to understand customer behaviour, identify patterns, and derive meaningful conclusions.

#### **4.3.1. Validity and Reliability**

Validity and reliability are two important concepts when considering the integration of web analytics with e-CRM. They pertain to the precision, coherence, and reliability of the data and insights obtained from the integrated system.

Validity pertains to the degree to which the data collected and analysed precisely captures the intended measurements. In the context of integrating web analytics with e-CRM, validity involves ensuring that the data captured from both systems effectively represents customer behaviour, interactions, and preferences.

Reliability, on the other hand, refers to the consistency and stability of the data and insights derived from the integrated system over time. Reliable data is consistent and can be replicated or reproduced consistently, providing confidence in the accuracy of the results. Reliability is essential as it ensures that decisions made based on the integrated data are trustworthy and can be relied upon. The following are the consideration that has been attended to by this model:

**Table 4-5: Consideration for Validity and Reliability**

No	Consideration	Description
1	Data Accuracy	Data accuracy is ensured between both systems where they are linked with reliable Fingerprint's visitorID to ensure they are referring to the same customer. On top of that, web analytics provides real-time analysis.
2	Data Integration Process	customization and creation of own reports, dashboards, and visualizations, and even extend the functionality using plugins and APIs
3	Data Quality	The proposed model provides data quality assurance by allowing filtration and exclusion of specific data from analytics reports. It also detects and filters out spam referrals and bot traffic. It also implements validation mechanisms to guarantee the integrity and precision of the gathered data. It checks for data discrepancies, anomalies, and potential data errors to maintain data quality.
4	Data Governance and Privacy	The proposed model allows full ownership and control of data. It also places a strong emphasis on user privacy and consent management. It provides tools for anonymizing IP addresses, respecting browser "Do Not Track" requests, and implementing user consent mechanisms. This aligns with privacy regulations and helps build trust with website visitors.
5	Data Analysis and Interpretation	The proposed model offers a range of visualization options, including charts, graphs, and customizable dashboards, to present data in a clear and understandable format. This facilitates easy analysis and interpretation of the data.

## CHAPTER 5

### DISCUSSION OF RESULTS

#### 5.0 Discussion of Results

Discussion of Results in the context of integrating web analytics with e-CRM refers to the examination and understanding of the data and findings obtained from the integration process. It involves examining the outcomes, evaluating the performance, and discussing the implications of the integrated system for marketing and customer relationship management.

#### 5.1 Case Study 1: Food & Beverage Site – DietChain

The case study conducted from 2019 to 2020 centred on the repercussions of the COVID-19 pandemic in Malaysia. During this period, Malaysia, like many other countries, encountered the challenges and repercussions stemming from the global health crisis. The government responded by implementing stringent public health measures to mitigate the spread of the virus. These measures included movement restrictions and the closure of businesses, schools, and other public spaces.

The pandemic had a profound effect on the Malaysian economy. Various sectors, such as tourism, manufacturing, and construction, experienced

significant setbacks. With travel restrictions and reduced consumer spending, the tourism industry suffered greatly. Manufacturers faced disruptions in their supply chains and decreased demand for their products due to the economic uncertainties brought about by the pandemic.

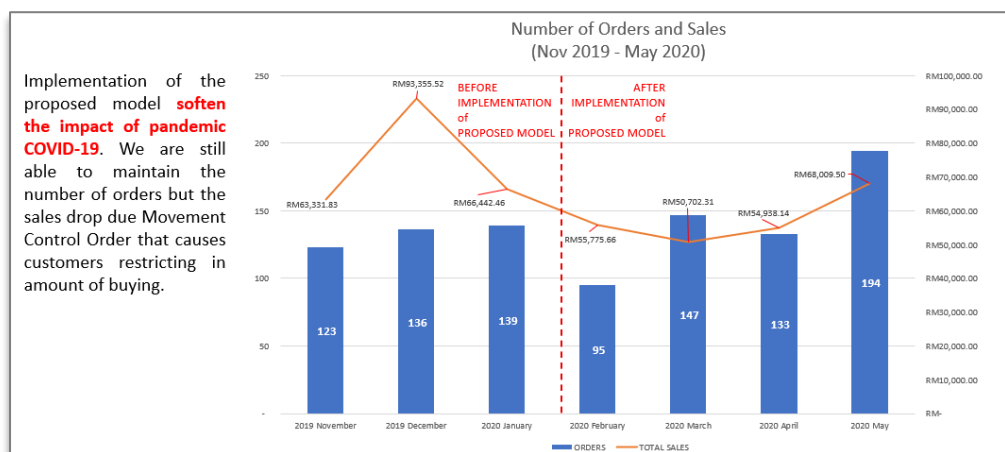
The economic downturn resulted in financial difficulties for many businesses in Malaysia. SMEs, in particular, faced significant challenges in sustaining their operations. As a result, many companies had to make difficult decisions, including layoffs, reduced working hours, and even closures. This led to a rise in unemployment rates and a decline in incomes for workers across various sectors.

One specific company that was part of the case study was DietChain (M) Sdn. Bhd., which operated an online product-selling website. Interviews and surveys were conducted with the company to gather information about their practices and experiences during the pandemic. It was revealed that the company had not implemented any e-CRM system. Instead, they relied on methods such as personal memory, order history, and WhatsApp messages to track their customers. Although they had implemented Google Analytics, it was not properly set up or utilized for meaningful insights.

The company's lack of a comprehensive e-CRM system and inadequate use of web analytics became more evident during the COVID-19 crisis.

As the pandemic hit and sales began to decline, they realized the importance of having a data-driven approach to customer management and marketing. Recognizing the potential benefits of integrating web analytics with e-CRM, they agreed to participate in the study with the hope that it would help them revitalize their business and navigate the challenges posed by the pandemic.

After conducting interviews and surveys in October 2019, the development of the integration of web analytics with the e-CRM model began in November 2019. At that time, the company's sales amounted to **RM63,331.83**. The implementation of the model took place in December 2019, and a sudden increase in sales was observed, reaching **RM93,355.52**. However, since it was still in the early stages of the study, there were very few records recorded and the results were not able to be duplicated.



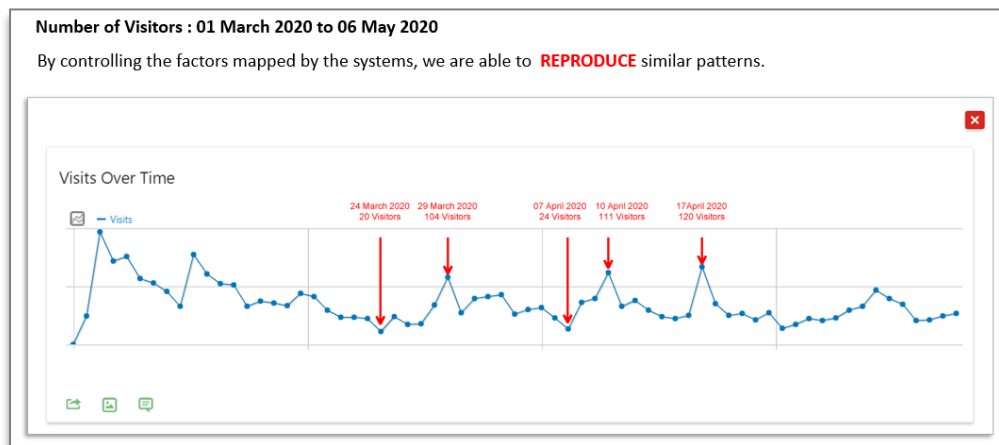
**Figure 5-1: Orders & sales during pre & post-implementation**

Over the time of three months, more proper records were recorded and that contributed to the improvement of the company's sales in March



2020. It is worth noting that on 18th March 2020, the first Movement Control Order (MCO) was implemented, which lasted until 14th April 2020. Surprisingly, as shown in **Figure 5-1**, the company's sales were not negatively affected by the MCO. There was an upward trend in sales. However, it should be acknowledged that the sales figures were not at the same level as before the MCO due to the rise in unemployment rates and declining incomes experienced across various sectors.

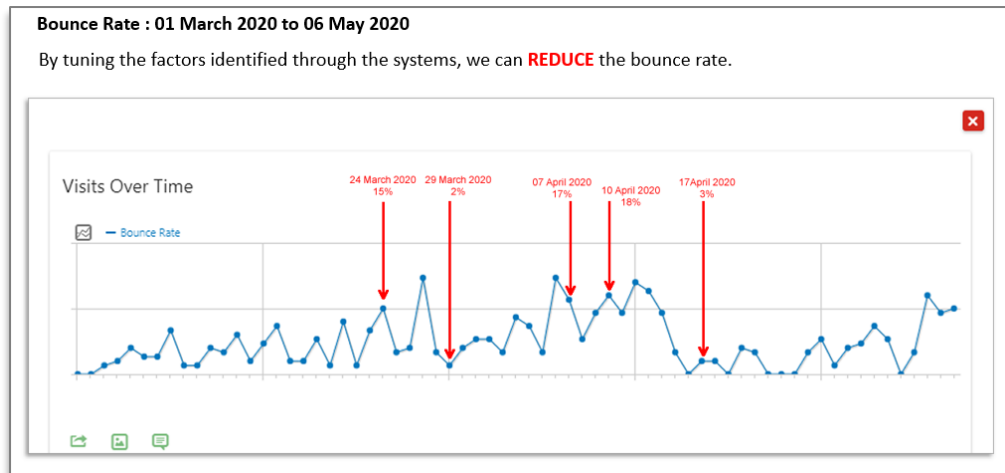
Nevertheless, due to the sustained high daily rate of new cases, authorities decided to extend the Movement Control Order (MCO II) until 12th May 2020, while the company's sales and orders continued to thrive without experiencing any adverse effects. This suggests that the integration of web analytics with e-CRM had a favourable influence on the company's capacity to uphold and potentially enhance sales performance amid challenging circumstances where it recorded **RM68,009.50** in sales.



**Figure 5-2:** Impact of the system on the number of visitors.

**Figure 5-2** illustrates that during the period from 01 March 2020 to 06 May 2020, an interesting pattern was observed in the recorded data from web analytics. This pattern became apparent when the study implemented a switching on and off of the proposed model. When the model was switched off, the organization operated in a state of uncertainty and the e-CRM system was unable to capture or respond to the marketing results. In this scenario, the e-CRM system could not identify individuals who had opened the email, while the web analytics system was unaware of visitors who had accessed the website or landing pages, thereby failing to update the e-CRM system. Without the functioning drip campaign enabled by the e-CRM, effective engagement and re-engagement activities were absent, leading to a decline in the number of visitors.

However, when the proposed model was activated, the proper implementation of effective engagement and re-engagement activities was restored, leading to a rise in website and landing page traffic. This process was repeated multiple times to validate that the observed increase in visitor numbers was indeed a direct consequence of the activation of the proposed model.

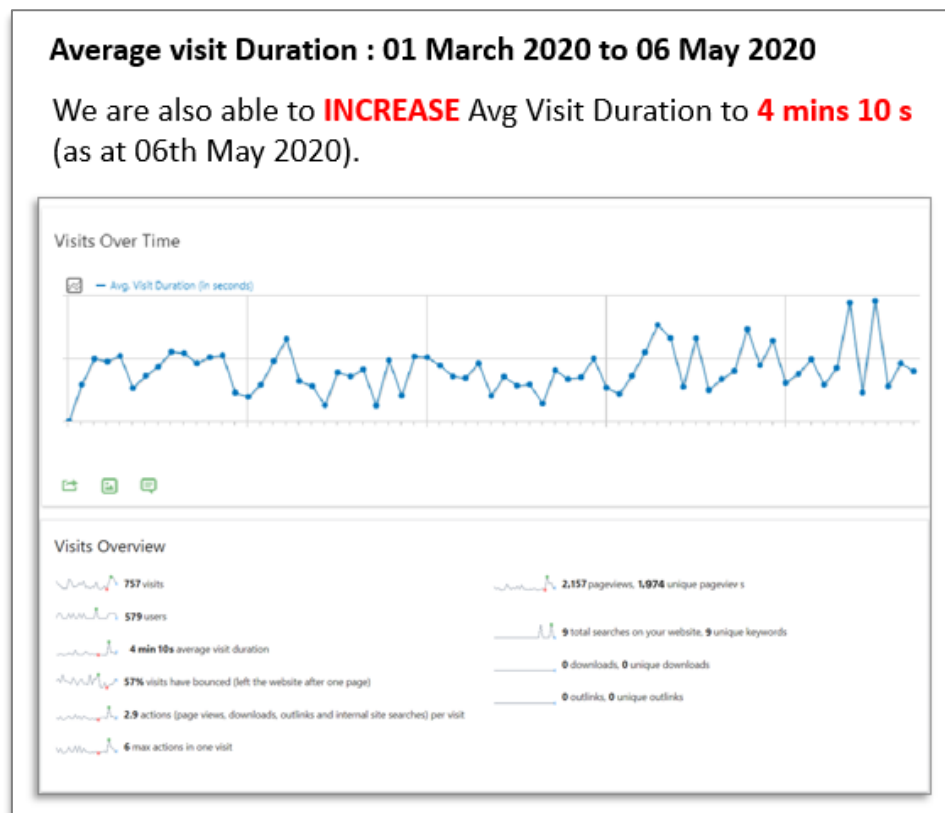


**Figure 5-3:** Impact of the system on the bounce rate.

**Figure 5-3** shows that in the absence of the recommended model, web analytics was unable to provide alerts regarding issues such as poor website layout, difficult navigation, or irrelevant content. As a result, visitors quickly leave the site without further engagement. The high bounce rate is attributed to traffic sources that were not targeted or relevant to the content or products/services being offered. This lack of relevance caused visitors to swiftly navigate away. Additionally, the e-CRM system was incapable of producing email campaigns that directed recipients to landing pages aligned with their interests or expectations. Without the assistance of web analytics, outdated, irrelevant, or below-expectation content went unnoticed, further contributing to visitor dissatisfaction. Furthermore, the absence of web analytics meant that valuable data on page load times, server response times, and other performance metrics was not available.

However, upon reactivation of the proposed model, customers are directed to content that aligns with their needs and preferences, leading

to improved engagement. web analytics once again serves a pivotal role by furnishing valuable data to the e-CRM system, which updates customer scores through drip campaigns. The insights gained from web analytics are then utilized to optimize web pages and landing pages, ensuring a better user experience. Consequently, the bounce rate is reduced, as visitors find the content more relevant and engaging.



**Figure 5-4:** Impact of the system on the average visit duration.

During the analysis, similar trends were identified in the average visit duration, as depicted in **Figure 5-4**. It was observed that the average visit duration significantly increased from **1 minute and 15 seconds** to **4 minutes and 10 seconds**.

This improvement in average visit duration was a direct outcome of the e-CRM system effectively guiding customers to content that was relevant and engaging. Simultaneously, web analytics played a crucial role in monitoring the user experience, ensuring that the website's navigation remained user-friendly. By tracking the behaviour of visitors, web analytics could identify instances where customers were exploring the entire page and engaging with the calls-to-action buttons.

Through the integration of e-CRM and web analytics, the process of directing customers to relevant content and monitoring their engagement became streamlined. The e-CRM system acted as a guide, ensuring that customers were directed to content that aligned with their preferences and interests. This personalized approach increased the likelihood of customers spending more time on the website, as they found the content engaging and tailored to their needs.

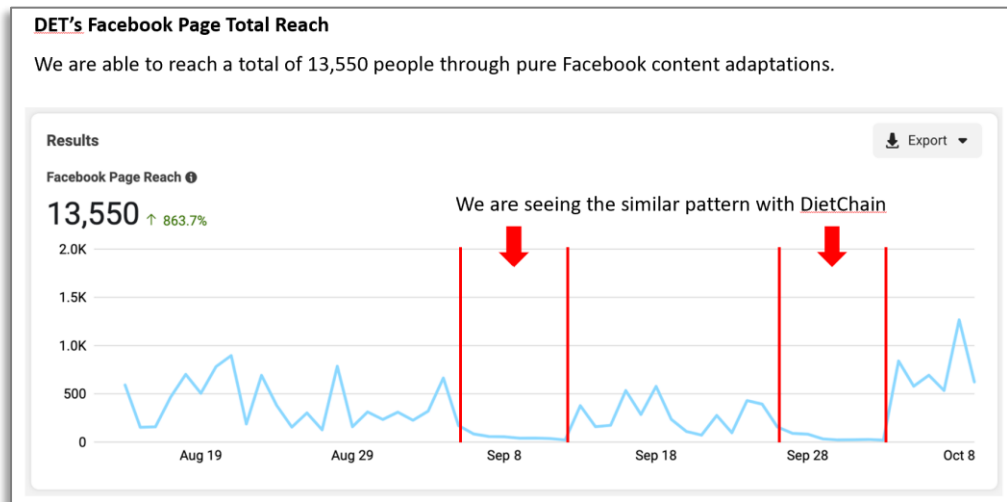
Simultaneously, the web analytics component continuously monitored the user experience, ensuring that the website's navigation remained intuitive and user-friendly. By tracking user behaviour, web analytics provided valuable insights into customer interactions with the website. It could identify instances where customers explored various sections of the website, indicating their interest and engagement. Additionally, the monitoring of clicks on calls-to-action buttons provided insights into the effectiveness of these elements in driving customer actions.

The combined efforts of e-CRM and web analytics resulted in a significant improvement in the average visit duration. Customers were directed to content that resonated with their interests and needs, while the website's user-friendly navigation facilitated seamless exploration. This, in turn, led to increased engagement and extended visit durations.

The integration of e-CRM and web analytics proved to be a powerful combination for optimizing customer experiences. The e-CRM system ensured that customers received personalized recommendations and content, increasing their satisfaction and interest. Meanwhile, web analytics provided real-time data on customer behaviour, allowing for continuous monitoring and refinement of the website's performance.

As the e-CRM system directed customers to relevant and engaging content, the impact on average visit duration became evident. Customers were more likely to spend extended periods on the website, exploring various sections and interacting with calls-to-action buttons. The longer visit durations indicated increased engagement and interest signify the success of the comprehensive approach.

## 5.2 Case Study 2: Universiti Tunku Abdul Rahman (UTAR)



**Figure 5-5:** Facebook Page Reach.

The second case study involves the utilization of the proposed model to support UTAR's marketing efforts in promoting their new degree program, "Digital Economy," from August 10, 2021, to October 9, 2021. When analysing **Figure 5-5**, we observe a similar pattern to what was seen in **Figure 5-3**. The reach of the Facebook marketing campaign was **purely organic, without any paid advertisements**, and successfully reached **13,550** users who visited the Facebook page.

During this period, an experiment was conducted, involving the switching on and off of the proposed model. When the model was switched off, there was a noticeable decline in the reach of the Facebook campaign. However, when the model was switched back on, the reach increased once again. The reason behind this observation lies in the functionality of the model. When the model was deactivated, the e-CRM system did not direct users to specific posts that aligned with their interests, resulting in a decrease in engagement. Additionally, the web

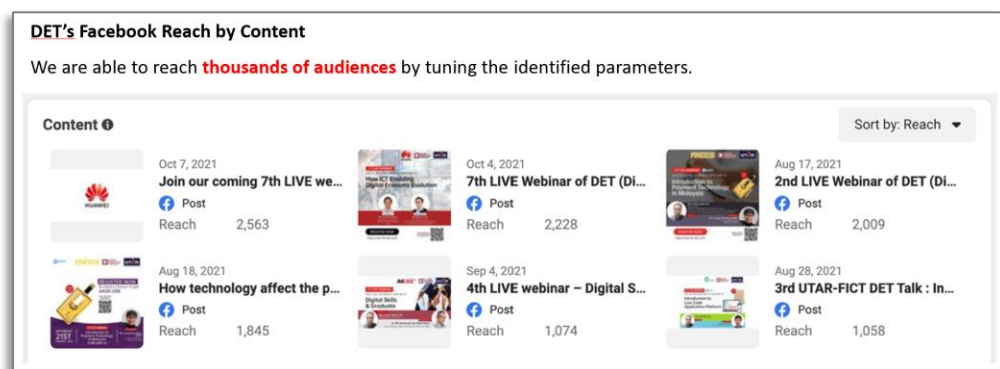
analytics component was unable to detect whether users accessed any posts or clicked on relevant links. Moreover, due to the lack of information from the e-CRM system, it was unable to determine the sources from which registered users originated, leading to a failure to re-engage with them effectively.

By implementing the proposed model, the e-CRM system played a crucial role in directing users to posts and content that were tailored to their interests. This personalized approach ensured that users were more likely to engage with the posts and stay connected with the marketing campaign. The web analytics component, when active, provided valuable insights into user behaviour, tracking their interactions with specific posts and links. This information was vital in understanding user engagement and optimizing future marketing efforts.

The effective implementation of the proposed model reaffirmed the potency of the integrated approach, while the outcomes derived from the second case study emphasize the importance of the proposed model in augmenting marketing endeavours. This particular case study provided a clear demonstration of how the proposed model significantly influenced UTAR's marketing campaign. By employing the integrated approach that combines e-CRM and web analytics, the reach of the Facebook campaign was optimized, resulting in heightened levels of user engagement. The provision of personalized content recommendations through the e-CRM system, in conjunction with the



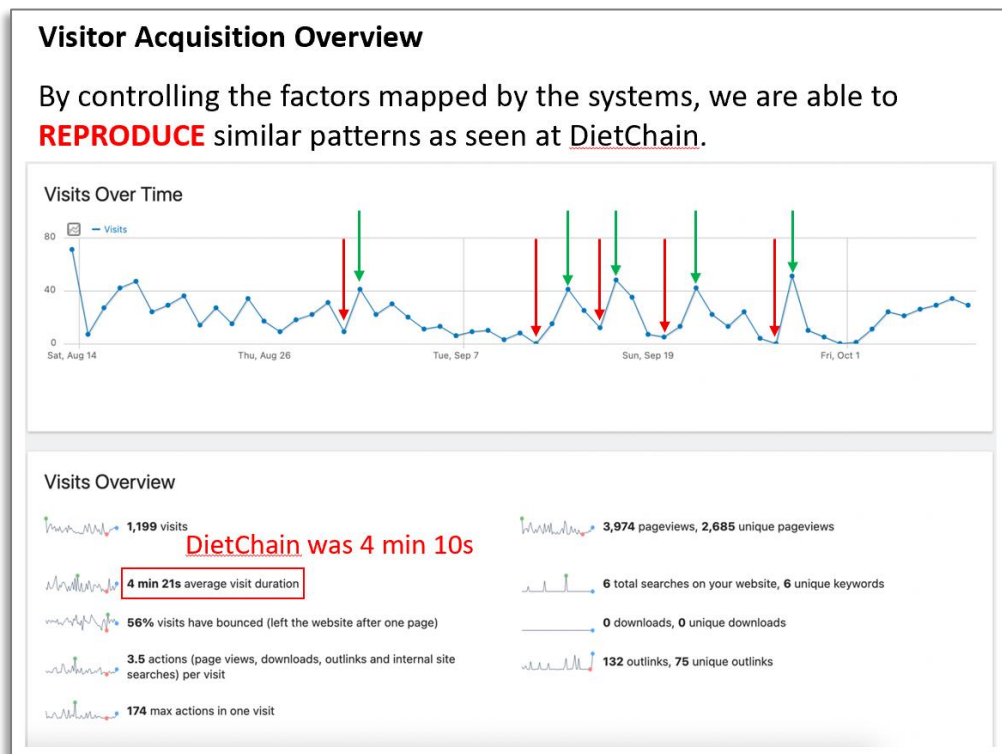
valuable insights offered by the web analytics component, played pivotal roles in stimulating user interactions and refining marketing strategies. These findings serve as a testament to the advantages of integrating e-CRM and web analytics in facilitating effective marketing campaigns and achieving favourable outcomes in terms of user reach and engagement.



**Figure 5-6:** Variety of posting to attract visitors

**Figure 5-6** depicts the various postings created to attract visitors based on their preferences. Promoting a degree without any marketing budget posed a significant challenge, particularly when it came to promoting the Department of Digital Economy Technology (DDET) Degree. The DDET Degree presented unique difficulties due to its broad scope, encompassing topics ranging from financial technology (FinTech) to property technology (PropTech). Consequently, a comprehensive marketing strategy was devised, drawing on the experience gained from implementing the model for DietChain. The results yielded surprising and interesting findings, as we were able to reach a total of **10,777 viewers** over **three months** from August 10, 2021, to October 9, 2021.

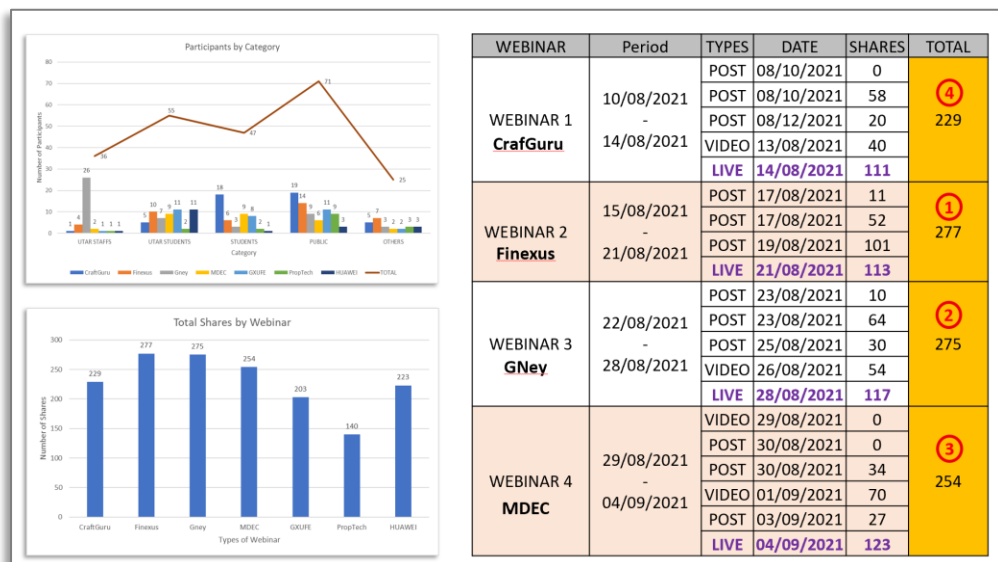
Specifically, the viewership breakdown was as follows: 2,563 viewers for the Huawei video post, 2,228 viewers for the Huawei advertisement post, 2,009 viewers for the Fintech advertisement post, 1,845 viewers for the Fintech call for registration post, 1,074 viewers for the Malaysia Digital Economy Corporation (MDEC) advertisement post, and 1,858 viewers for the development workshop post. These viewers engaged with the landing pages and videos presented to them, indicating a promising level of interest and involvement.



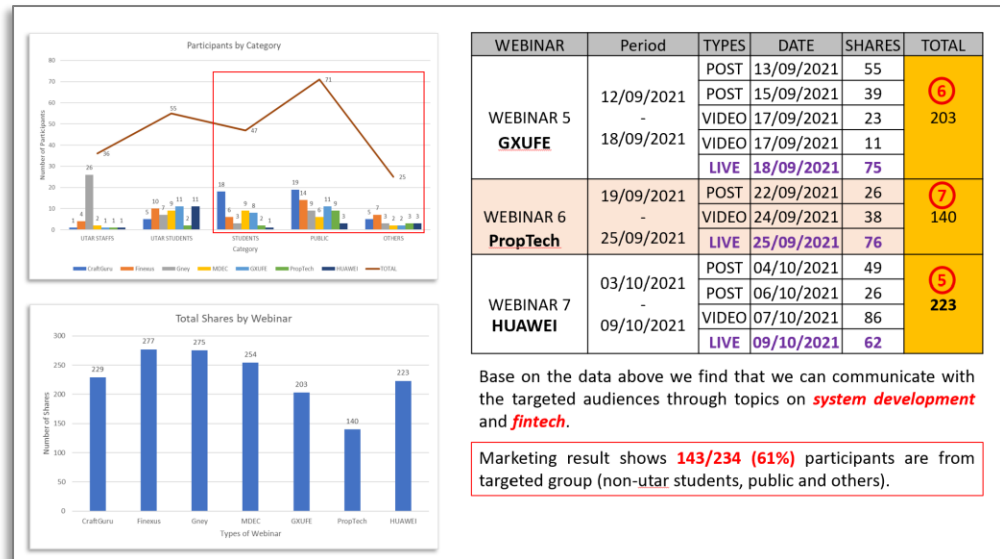
**Figure 5-7: Visitor Acquisition Overview**

**Figure 5-7** serves as evidence that the proposed model can replicate the results achieved at DietChain, specifically in terms of the average visit duration. The data presented in **Figure 5-7** indicates that the average

visit duration at UTAR was **4 minutes and 21 seconds**, which is comparable to the average visit duration of **4 minutes and 10 seconds** observed at DietChain. This finding is particularly noteworthy considering that DietChain operates in the Food and beverages industry, while UTAR is an educational institution. Despite the stark differences between these two industries, the proposed model was able to yield similar outcomes in terms of user engagement and visit duration. This observation sheds light on the **repeatability and reproducibility** of the model's effectiveness, demonstrating its potential to **deliver positive results across diverse sectors**.



**Figure 5-8: Initial group sharing**

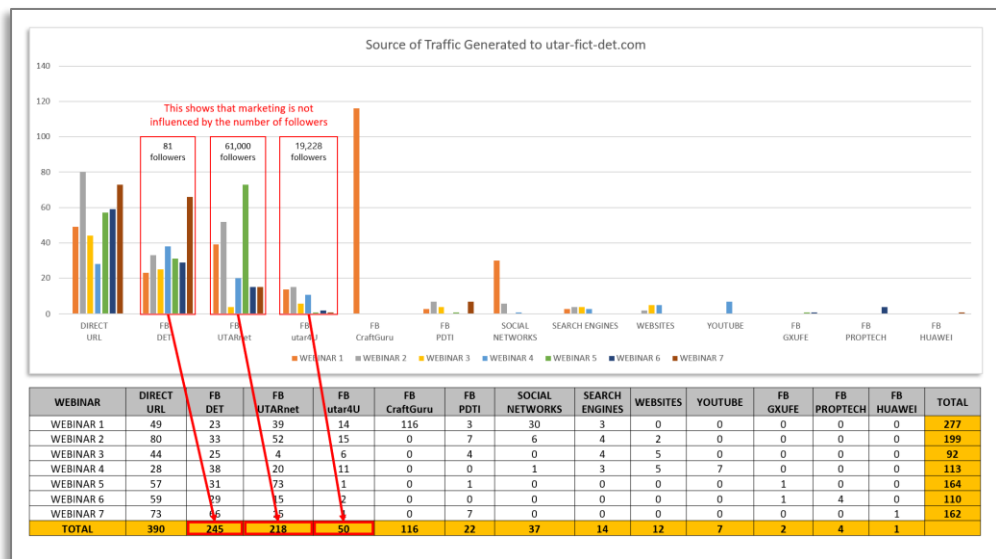


**Figure 5-9:** Second group sharing

**Figure 5-8** and **Figure 5-9** provide valuable insights regarding the effectiveness of posting a few content pieces for a marketing campaign instead of one at a time. These diagrams illustrate that a focused approach, where postings are carefully selected and shared, can lead to improved outcomes in terms of customer engagement. In the context of case study two, the e-CRM system played a crucial role in guiding customers towards relevant content that matched their preferences and interests. Through the implementation of the proposed model, UTAR, particularly the Faculty of Information and Communication Technology (FICT), was able to concentrate its promotional efforts on "system development" and "Fintech" materials, which garnered the highest viewership and generated a significant number of registered participants.

If considering it from a broader perspective, this model holds immense potential in assisting numerous SMEs that carry multiple products. By

utilizing the model, these SMEs can identify their key products and allocate their marketing investments wisely, focusing on promoting those products that offer the most value and potential for success. This targeted approach allows SMEs to improve their marketing approaches and enhance their returns on investment. By harnessing the integration of e-CRM and web analytics, organizations can obtain valuable understandings regarding customer inclinations, behaviour, and engagement. This empowers them to base decisions on data-driven insights and efficiently allocate their marketing resources. The model functions as a potent instrument for SMEs to identify their core products and streamline their marketing endeavours, thereby enhancing their competitiveness and profitability within the market.



**Figure 5-10:** Number of followers vs. Campaign Success

This study provided a distinctive opportunity to explore the correlation between the number of followers and the efficacy of a marketing

campaign. In **Figure 5-10**, three distinct Facebook pages were examined: UTARnet and utar4u, both being UTAR's official Facebook pages with 61,000 and 19,228 followers respectively, and the DET Facebook page, which was specifically created for this marketing campaign and had a mere 81 followers. As the marketing campaign progressed, the results revealed an intriguing pattern. While utar4u generated only 50 leads and UTARnet attracted 218 leads, the DET page surprisingly garnered 245 leads. These findings provide strong evidence that the number of followers on a Facebook page no longer serves as a determining factor in the success of a marketing campaign, thanks to the implementation of the proposed model.

The implications of these findings are noteworthy. Traditionally, organizations have placed great emphasis on increasing their follower count as a means to amplify the reach and impact of their marketing efforts. However, this study challenges the notion that a higher number of followers equates to higher campaign success. By leveraging the integrated approach of e-CRM and web analytics offered by the proposed model, organizations can effectively engage with their target audience and drive desired outcomes, regardless of the size of their follower base.

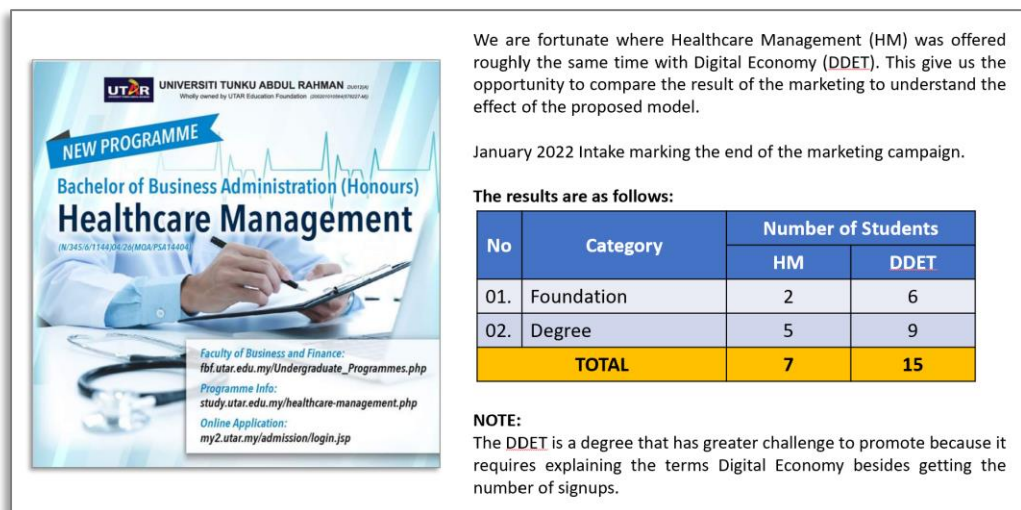
The success of the DET Facebook page, despite its modest number of followers, can be attributed to the personalized content recommendations provided by the e-CRM system. By analysing user

preferences and interests, the system guided individuals towards content that resonated with them, resulting in higher engagement and conversion rates. Additionally, the insights derived from web analytics enabled continuous monitoring and optimization of the campaign, ensuring that the content remained relevant and impactful.

These findings have far-reaching implications beyond the scope of this study. Organizations, particularly those with limited resources or newly established pages, can take solace in the fact that the effectiveness of their marketing campaigns is not solely contingent on the size of their follower base. Instead, by adopting the proposed model and harnessing the power of personalized content recommendations and data-driven insights, they can achieve remarkable results even with a smaller following.

Moreover, this study highlights the need for a shift in focus from quantity to quality. Rather than obsessing over the number of followers, organizations should concentrate on fostering meaningful and engaging interactions with their existing audience. By delivering relevant and tailored content, leveraging the insights provided by web analytics, and implementing effective engagement strategies, organizations can cultivate a loyal and responsive customer base, leading to increased conversions and overall campaign success.

It is worth noting that while the number of followers may no longer be the primary indicator of campaign success, it still holds value in terms of brand visibility and social proof. A larger follower base can enhance the organization's credibility and attract new potential customers. However, the key takeaway from this study is that follower count alone should not be the sole focus or measure of success. Organizations should prioritize delivering value to their audience, nurturing relationships, and leveraging the capabilities of the proposed model to achieve optimal campaign outcomes.



**Figure 5-11:** Campaign success with the proposed model

This study has been incredibly fortunate to encounter numerous opportunities to demonstrate its efficacy. In **Figure 5-11**, we observe a significant contrast during the marketing campaign for the DDET degree, while UTAR concurrently promoted its Healthcare Management (HM) program. In terms of degree names alone, HM is relatively straightforward to comprehend compared to the complexity of DDET.



However, it is noteworthy that HM was promoted using conventional methods, whereas the proposed model was employed to promote DDET. As the campaign period concluded, a stark disparity in performance between DDET and HM became apparent.

The results indicate that DDET outperformed HM by a considerable margin. For the foundation level, DDET attracted six registrations, while HM managed only two. At the degree level, DDET secured nine registrations, whereas HM garnered only five. Overall, DDET accumulated a total of 15 registrations, surpassing HM's seven registrations. Once again, the effectiveness of the proposed model has been conclusively demonstrated.

These findings highlight the transformative impact of the proposed model on the success of marketing campaigns. Despite the inherent challenges associated with promoting a complex degree like DDET, the model's integrated approach of e-CRM and web analytics proved instrumental in achieving remarkable outcomes. By leveraging personalized content recommendations and harnessing the power of data-driven insights, the model effectively guided potential students towards the DDET program, resulting in higher levels of engagement and registration.

The success of DDET, compared to HM, can be attributed to several key factors. Firstly, the proposed model's ability to tailor content based on

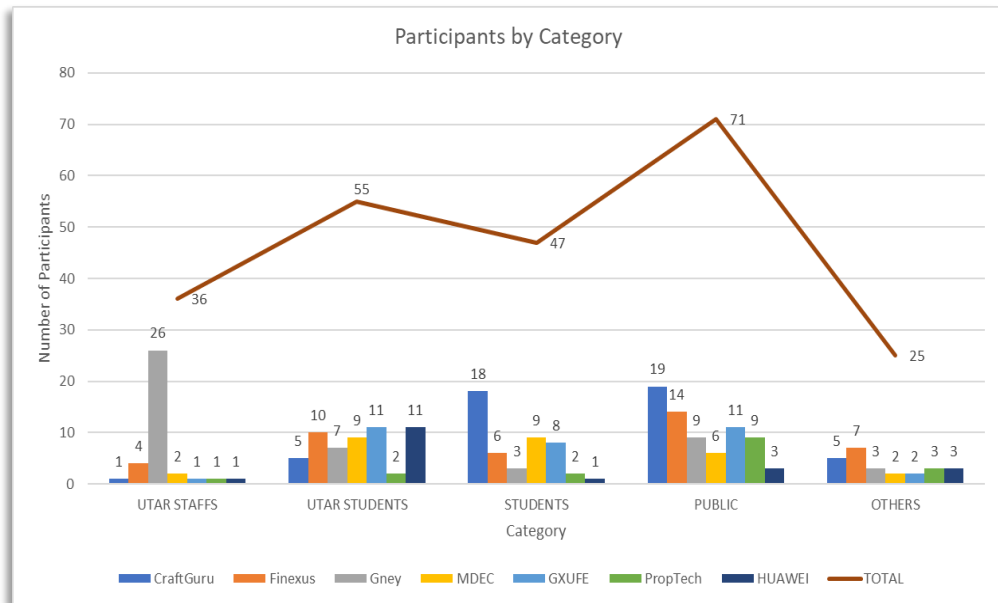
individual preferences and interests played a crucial role. By understanding the unique needs and aspirations of prospective students, the model directed them towards relevant and compelling information about the DDET program. This personalized approach significantly enhanced the appeal and resonance of the campaign, leading to higher conversion rates and registration numbers.

Furthermore, the insights provided by web analytics enabled continuous monitoring and optimization of the campaign for DDET. This allowed for timely adjustments to be made in response to user behaviour and preferences, ensuring that the marketing efforts remained highly targeted and effective. The ability to monitor metrics like page visits, click-through rates, and engagement levels provided valuable data that informed decision-making and facilitated ongoing campaign improvements.

The superiority of the proposed model over conventional methods used for promoting HM underscores the importance of adopting innovative and integrated approaches in marketing campaigns. Conventional methods, while widely employed, often lack the personalization and data-driven insights necessary to effectively engage with today's discerning audience. By contrast, the proposed model leverages advanced technologies and analytics to deliver highly tailored and relevant content, establishing a deeper connection with potential students.

From a broader perspective, these findings have far-reaching implications for educational institutions and other organizations embarking on marketing campaigns. The proposed model not only facilitates the promotion of complex or niche offerings but also challenges the notion that easier-to-understand programs inherently enjoy greater success. It highlights the significance of employing data-driven strategies and personalized approaches to capture the attention and interest of target audiences.

Moreover, the success of the proposed model in promoting DDET and outperforming HM demonstrates its potential to revolutionize marketing efforts across various industries. The model's ability to effectively communicate the value and benefits of products or services, even in highly specialized fields, opens up new avenues for organizations to reach their target markets. This holds particular significance for SMEs that may face constraints in their marketing budgets or possess specialized offerings. By adopting the proposed model, these organizations can discover and promote their focus products, optimizing their marketing investments and maximizing their impact.



**Figure 5-12:** Campaign Successfully reaching its target audiences

Drawing insights from **Figure 5-12**, it becomes evident that the proposed model's impact extends beyond simply attracting more viewers compared to conventional methods or Facebook pages with larger follower counts. It has also proven successful in reaching the intended target audience, which comprises the general public and individuals outside of the UTAR community. Notably, the marketing results reveal that out of a total of 234 participants, 143 individuals, accounting for 61% of the participants, belong to the targeted group.

This achievement underscores the efficacy and precision of the proposed model in reaching and engaging the desired audience. By employing a comprehensive approach that integrates e-CRM and web analytics, the model effectively identified and targeted the public and non-UTAR individuals who were the primary focus of the campaign. The

personalized content recommendations generated by the e-CRM system, combined with the insights derived from web analytics, played a pivotal role in optimizing audience targeting and maximizing the campaign's impact.

The ability of the proposed model to successfully attract and engage a significant number of participants from the targeted group is a testament to its effectiveness in aligning marketing efforts with specific objectives. By employing advanced analytics and leveraging data-driven insights, the model facilitated the delivery of tailored content that resonated with the identified audience segments. This personalized approach significantly enhanced the relevance and appeal of the marketing campaign, resulting in a higher participation rate from the intended target group.

Moreover, the model's integrated approach provided valuable metrics and analytics to gauge the campaign's performance and effectiveness in reaching the target audience. The data captured through web analytics allowed for continuous monitoring and optimization of the marketing strategies, enabling real-time adjustments to be made based on user behaviour and preferences. This iterative process ensured that the campaign remained focused, relevant, and engaging to the targeted group, ultimately driving a higher rate of participation.

The successful targeting and engagement of the intended audience through the proposed model present significant implications for marketing strategies across diverse industries. Traditionally, reaching and engaging specific target groups has been a complex and challenging endeavour, often requiring substantial resources and extensive market research. However, the proposed model demonstrates a more efficient and effective approach, offering organizations the opportunity to precisely identify and connect with their desired audience segments.

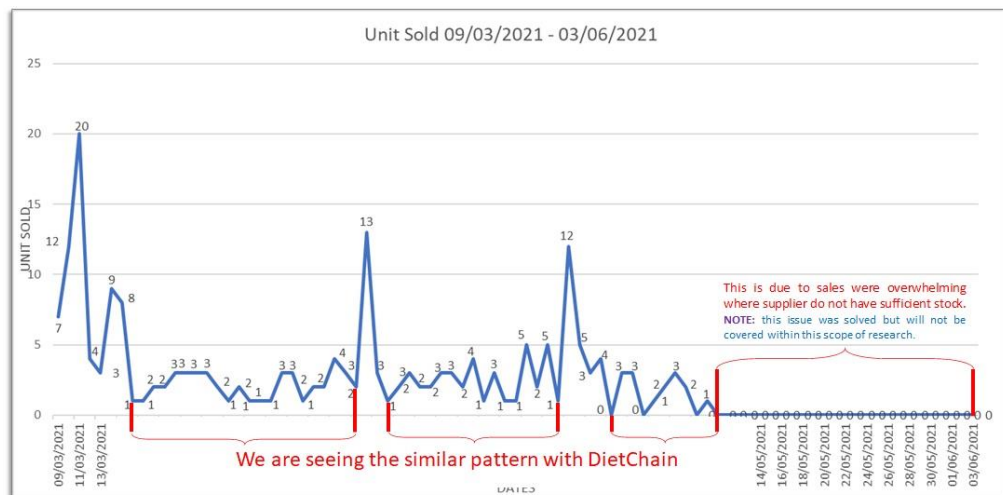
This breakthrough is particularly noteworthy for businesses and institutions seeking to expand their reach beyond their established networks or customer bases. By leveraging the capabilities of the proposed model, they can successfully penetrate new markets, engage with previously untapped audiences, and achieve a higher level of participation from their targeted groups. This opens up new possibilities for growth and success, as organizations can leverage data-driven insights to tailor their marketing efforts to the unique preferences and needs of specific customer segments.

Furthermore, the ability of the proposed model to reach and engage the targeted group has broader implications for organizations operating in competitive markets. By employing a precise and targeted marketing approach, organizations can differentiate themselves from competitors and gain a competitive edge. The model's success in attracting participants from the desired audience segments demonstrates its

potential to help organizations stand out in crowded marketplaces and position themselves as the preferred choice among their target customers.

In summary, **Figure 5-12** serves as compelling evidence that the proposed model surpasses conventional methods and even Facebook pages with larger follower counts in terms of attracting viewers. Moreover, it has effectively reached the target group it was designed to engage, with 61% of participants hailing from the intended audience. This outcome is a testament to the model's ability to precisely target and engage specific audience segments, optimizing the impact and effectiveness of marketing campaigns. As organizations seek to reach new markets and connect with their desired audiences, the proposed model offers a powerful and data-driven solution that can propel their marketing efforts to new heights.

### 5.3 E-Commerce Site



**Figure 5-13:** Clearance of Sales within 3 months

The study embarked on a new venture to determine the **repeatability and reproducibility** of the proposed model in the e-commerce industry, following its successful implementation in the Food & Beverages and education sectors. The experimentation commenced on 09 March 2021, where the proposed model was deployed, leveraging the knowledge and settings acquired from previous implementations. Notably, the introduction of the proposed model resulted in a significant surge in sales almost immediately.

Had the proposed model not been part of the study and instead operated continuously, the products under investigation would have likely sold out in a considerably shorter time frame. However, due to the study's requirements, the proposed model had to be periodically switched on and off to evaluate its impact. Consequently, **Figure 5-13** illustrates the anticipated outcome, wherein the sales experienced a drop when the proposed model was switched off and a subsequent increase when it was switched on again. This pattern closely resembles the observations made in the DietChain and UTAR case studies, reinforcing the consistency of the model's impact across different industries.

The findings from **Figure 5-13** provide further evidence of the proposed model's efficacy in driving sales and enhancing marketing outcomes. The immediate drop in sales upon switching off the model suggests that its implementation played a pivotal role in stimulating customer engagement and purchase decisions. The model's ability to attract and

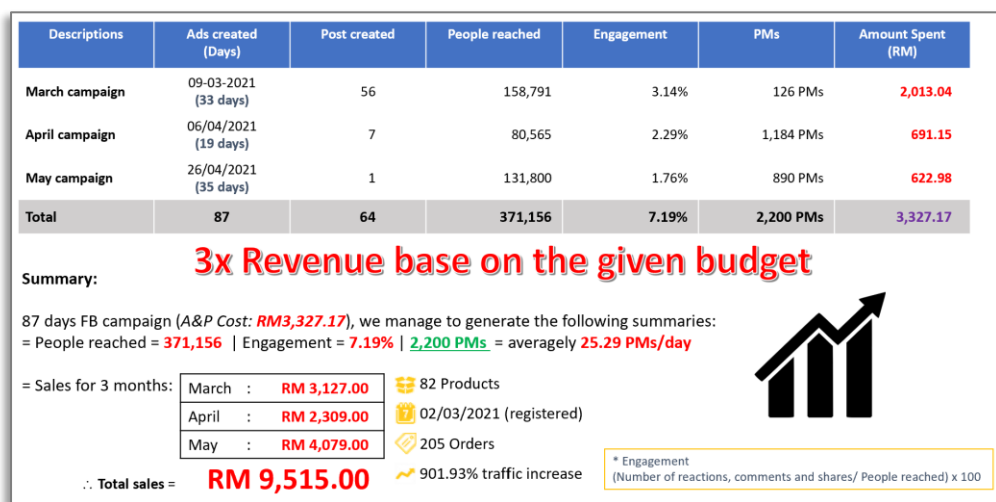


guide customers toward relevant products, coupled with the insights derived from web analytics, facilitates a seamless and personalized shopping experience. Consequently, customers are inclined to complete a purchase, leading to heightened sales and overall revenue.

This consistent pattern observed across multiple industries signifies the robustness and reliability of the proposed model. The model's ability to replicate its impact and generate similar sales trends in distinct sectors, such as Food and beverages, education, and now e-commerce, reinforces its repeatability and reproducibility. These results highlight the generalizability of the model's principles and its potential to benefit a wide range of industries.

The successful implementation of the proposed model in the e-commerce industry demonstrates its adaptability and effectiveness in diverse business contexts. By leveraging the model's integrated approach, businesses operating in the e-commerce sector can improve their marketing approaches, enhance customer interaction, and boost sales. The combination of e-CRM and web analytics provides meaningful understandings of customer behaviour, choices, and buying trends. These understandings can be employed for tailor marketing campaigns, personalize product recommendations, and deliver a more compelling and relevant shopping experience.

The findings from the e-commerce case study further reinforce the notion that the proposed model extends beyond particular and is applicable to a broader range of businesses. Its ability to generate consistent and positive outcomes across various sectors underscores its potential as an invaluable resource for organizations aiming to enhance their marketing efforts and achieve desirable business results.



**Figure 5-14:** Success in e-commerce sector with the proposed model

In many industries, the success of a business is often measured by its sales figures, which serve as a key indicator of ROI. **Figure 5-14** provides a real-life example of such success in the e-commerce sector, where the implementation of the proposed model resulted in remarkable outcomes. Initially, when the proposed model was first introduced, a greater number of posts and a higher advertisement budget were required to collect valuable data on customer behaviour within a short period. However, as the marketing campaign progressed and the customers' behaviour became better understood, the need for frequent posts and a

large advertisement budget decreased. Interestingly, this reduction in marketing efforts did not lead to a decrease in the number of Private Messages (PMs) received from customers inquiring about the products being sold.

Throughout the 87-day Facebook marketing campaign, the company allocated a total of RM3,327 (March: RM2,013.04, April: RM691.15, and May: RM622.98) as Advertisement and promotion (A&P) costs. In return, the proposed model proved its effectiveness by reaching an impressive audience of 371,156 individuals, achieving a noteworthy engagement rate of 7.19%. On average, the campaign generated 25.29 PMs per day from potential customers expressing interest in the products. The revenue generated from this campaign amounted to RM9,515.00, which is three times the initial budget investment.

The outcomes depicted in **Figure 5-14** underscore the significant impact of the proposed model on the e-commerce business. By implementing the model, the company was able to maximize its reach and engagement with potential customers, leading to a substantial increase in revenue. Initially, a greater marketing effort was necessary to gather essential data on customer behaviour, but as the campaign progressed, the model's ability to identify and understand the target audience enabled more efficient and cost-effective marketing strategies. Despite reducing the frequency of posts and the advertisement budget, the company continued to receive a steady stream of inquiries from interested customers. This

indicates that the proposed model successfully attracted and engaged the target audience, prompting them to actively reach out to the business for further information.

The return on investment achieved through the implementation of the proposed model is noteworthy. By investing a total of RM3,327 in A&P costs, the company was able to generate a substantial revenue of RM9,515.00. This threefold increase in revenue demonstrates the effectiveness and profitability of the proposed model in the e-commerce industry. Furthermore, the significant engagement rate of 7.19% indicates that the campaign successfully captured the attention and interest of the target audience, ultimately driving them to take action and initiate direct communication with the company.

The success depicted in **Figure 5-14** serves as a testament to the power of the proposed model in driving sales and maximizing ROI. By leveraging the insights provided by the model, the company was able to tailor its marketing strategies to efficiently connect and captivate potential customers. The ability to identify the optimal timing, frequency, and content of posts allowed the company to optimize its advertisement budget and allocate resources more efficiently. As a result, the campaign not only achieved a high level of engagement but also generated substantial revenue, surpassing expectations and delivering a remarkable return on the initial investment.

The results of the above case studies underscore the significance and potential of the proposed model in the e-commerce industry. By leveraging its capabilities, businesses can optimize their marketing strategies, attract a larger audience, and drive higher levels of customer engagement. The ability to reach a considerable audience and generate a substantial volume of inquiries demonstrates the effectiveness and efficiency of the proposed model in converting audience interest into tangible business outcomes.

#### 5.4 Implementation Outcomes – Qualitative Findings

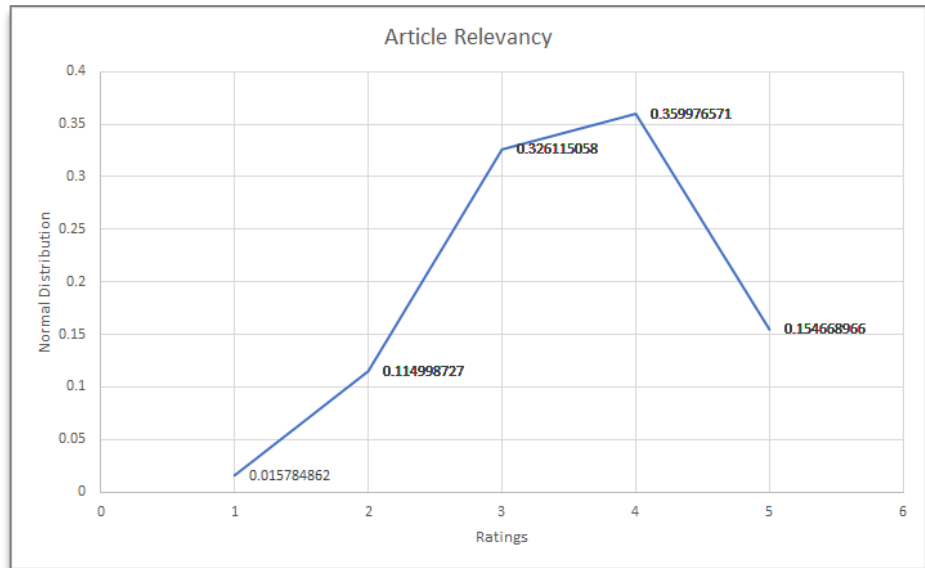
In addition to the above discoveries, a comprehensive analysis of all the interviews and surveys conducted reveals overwhelmingly positive outcomes stemming from the integration of web analytics and e-CRM. The amalgamation of these two pivotal elements has yielded significant advantages and transformative effects on the operational landscape.

##### 5.4.1. Customer surveys and interviews conducted

**Table 5-1:** Customer feedback on Marketing information

<b>RATING</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
1	10	0.10%
2	2,011	20.11%
3	1,964	19.64%
4	3,952	39.52%
5	2,063	20.63%
<b>TOTAL</b>	<b>10,000</b>	<b>100.00%</b>

**Table 5-1** displays results from a survey that included 10,000 customers who received marketing information generated by the proposed and applied model. The majority of respondents provided ratings, indicating the relevance of the marketing information to them. **Figure 5-15** visually depict the outlined data.



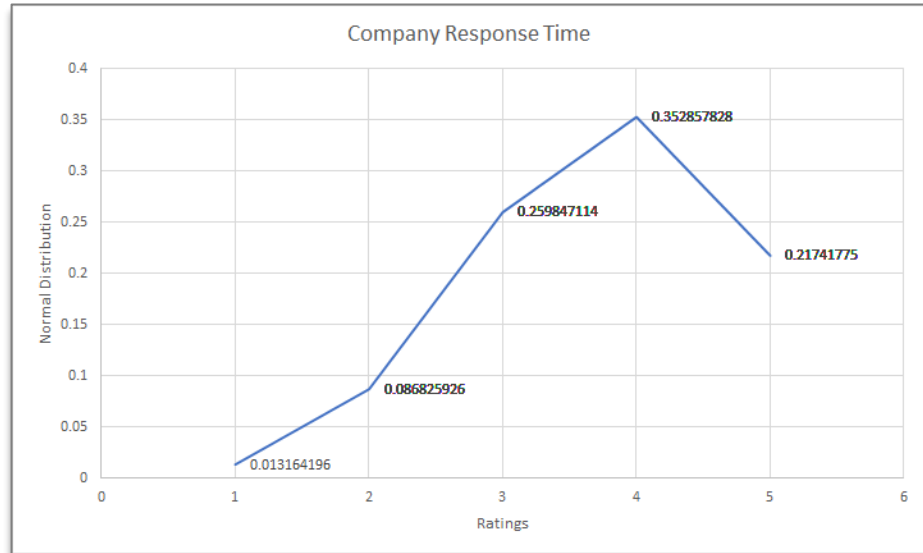
**Figure 5-15: Article Relevancy**

The effective use of e-CRM to capture customer feedback has enabled customer service to respond more efficiently, leading to improvements in customer satisfaction.

**Table 5-2: Company Response Time**

<b>RATING</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
1	5	0.05%
2	1,947	19.47%
3	1,084	10.84%
4	3,099	30.99%
5	3,865	38.65%
<b>TOTAL</b>	<b>10,000</b>	<b>100.00%</b>

In **Table 5-2**, survey outcomes from 10,000 customers rating the company's response time are displayed. The majority of respondents assigned ratings, signalling prompt response times. **Figure 5-16** visually illustrate the presented data.



**Figure 5-16:** Company Response Time

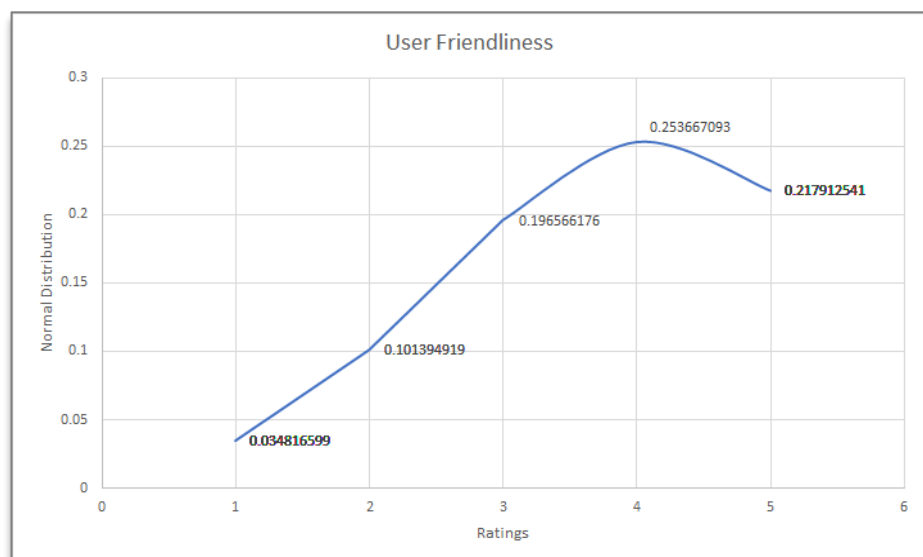
#### 5.4.2. Employee surveys and interviews conducted

Apart from external customer surveys, internal surveys targeted employees directly interacting with the system. Results, detailed in the following table, capture feedback on the user-friendliness (UI) and user experience (UX) of the proposed model.

**Table 5-3:** User-friendliness using the Data-Driven E-CRM

RATING	FREQUENCY	PERCENTAGE
1	27	18%
2	2	1%
3	8	5%
4	1	1%
5	112	75%
<b>TOTAL</b>	<b>150</b>	<b>100.00%</b>

Survey results in **Table 5-3** indicate that most employees find the system relatively user-friendly. However, some in the 53-58 age group perceive learning a new system as cumbersome, expressing a preference for the status quo. To address this, age-friendly training can be implemented to enhance understanding and minimize resistance to change. **Figure 5-17** visually illustrate the presented data.



**Figure 5-17:** User-friendliness

The model, designed with considerations for usefulness, desirability, accessibility, credibility, findability, usability, and value-impact, caters to age groups ranging from 20 to 50. This approach has been validated through a survey involving 150 employees, including customer service personnel and managers.

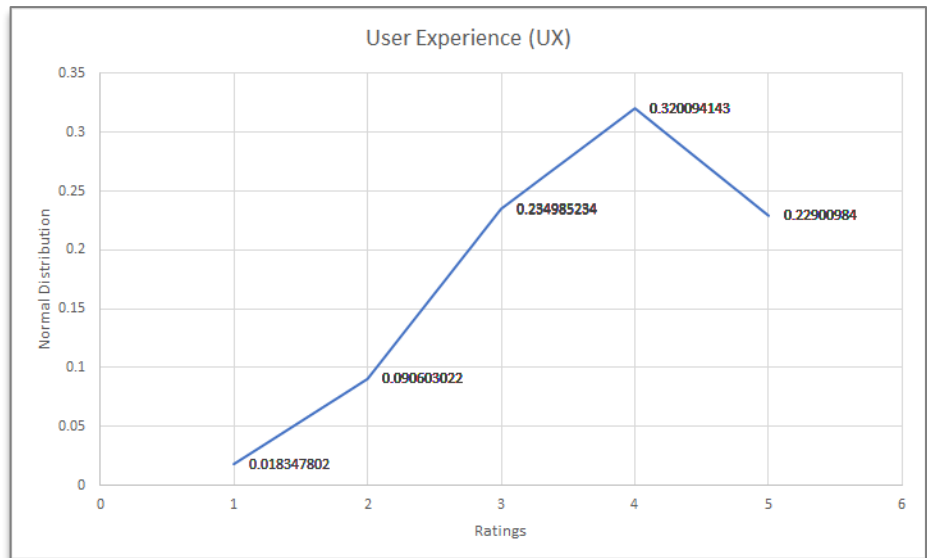


**Table 5-4:** Data-Driven E-CRM User Experience (UX)

<b>RATING</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
1	4	3%
2	25	17%
3	19	13%
4	24	16%
5	78	52%
<b>TOTAL</b>	<b>150</b>	<b>100.00%</b>

**Table 5-4** consolidates responses, indicating that most employees appreciate the integration of web analytics with e-CRM. This approach allows them to access both sets of data within a unified system, eliminating the need to log in to multiple systems. This integration contributes to reducing errors in analyses and mitigates the risk of overlooking crucial information.

Respondents also highlighted that the proposed model aids in lowering the learning curve, requiring less training for new employees compared to the previous system. Furthermore, the proposed system assists in interpreting results and recommending subsequent actions, streamlining workload and enabling a focus on areas that require more human intervention. **Figures 5-18** visually illustrate the presented data.



**Figure 5-18: User Experience (UX)**

## 5.5 General Discussion

Understanding the impact of integrating web analytics and e-CRM on the design and marketing materials is a valuable exercise that warrants attention. Initially, during the study made for the e-commerce site in **Section 5.3**, a design was created as shown in **Figure 5-19**. when examining **Figure 5-20**, the design appears visually appealing and promising in terms of attracting viewers and driving sales.

**BUY 1 GET 6 FREE**

- Tempered Glass
- Anti-Break Back Case
- T-Shirt
- Backpack
- Mi 10,000mAh Power Bank.
- Mi Rainbow Earphone.

**A . Mi 4 (16 GB) : MYR 699**  
Colour = White

**BUY 1 GET 5 FREE**

- Tempered Glass
- Anti-Break Back Case
- T-Shirt
- Backpack
- Mi Rainbow Earphone.

**B . Mi Max (32 GB) : MYR 899**  
**C . Mi Max (64 GB) : MYR 1,099**  
Colour = Gold / Silver

**BUY 1 GET 5 FREE**

- Tempered Glass
- Anti-Break Back Case
- T-Shirt
- Backpack
- Mi Rainbow Earphone.

**D . Redmi 4 (32 GB) : MYR 769**  
Colour = Silver

**BUY 1 GET 5 FREE**

- Tempered Glass
- Anti-Break Back Case
- T-Shirt
- Backpack
- Mi 5,000mAh Power Bank.

**E . Redmi Pro (64 GB) : MYR 969**  
Colour = Gold

**Price Shown Exclude Postage:**  
Peninsular Malaysia : MYR 9.60  
Sarawak & Sabah : MYR 38.11

- Original set
- 1 year warranty (Malaysia)

**Figure 5-19:** A normal design to attract customers

However, in practice, this design proves to be ineffective in generating significant traffic when compared to version B, as depicted in **Figure 5-20**. Despite being a more cost and time-efficient option, the design showcased in **Figure 5-19** fails to generate the desired level of traffic and sales, making it ultimately "very costly." Through surveys conducted using the proposed model, it was discovered that the design was overwhelming and confusing for viewers. As a result, version B, illustrated in **Figure 5-20**, was created, leading to immediate sales and the depletion of stock within a two-month marketing campaign.



**Figure 5-20:** Version B of Figure 5-19

Upon closer examination, the discrepancy between the two designs reveals the crucial role of design effectiveness in driving consumer engagement and sales. While the initial design may appear aesthetically pleasing, it fails to effectively communicate the intended message and capture the interest of the target audience. As a consequence, it falls short of generating the desired level of traffic and conversions.

The surveys conducted through the proposed model played a critical role in discerning the shortcomings associated with the initial design. By gathering feedback from potential customers (out of 100 random surveys made, only 5 accepted the **Figure 5-19** design), the study was able to gain insights into their preferences and expectations. It became evident that the design showcased in **Figure 5-19** was overwhelming and confusing for viewers, resulting in a lack of engagement and ultimately leading to poor sales performance.

To address these concerns, version B was developed, taking into account the feedback received from the target audience. This revised design was optimized to effectively communicate the message and resonate with potential customers. As a result, the impact was immediate, with the marketing campaign for version B leading to a surge in sales and the complete depletion of stock within a short span of two months.

The significance of design in driving marketing success cannot be underestimated. It serves as a crucial component in capturing the attention of potential customers and conveying the value and appeal of a product or service. A visually appealing and well-executed design has the power to create a positive first impression, spark interest, and encourage further exploration or purchase.

The case presented in **Figure 5-19** and **Figure 5-20** highlights the importance of carefully evaluating design choices in the marketing process. While the initial design may appear cost-effective in terms of production, its lack of effectiveness in generating traffic and sales proves to be a costly mistake. On the other hand, version B, with its improved design based on customer feedback, delivers remarkable results, resulting in a successful marketing campaign.

This case study emphasizes the value of customer feedback and the integration of web analytics and e-CRM in shaping effective design choices. By leveraging these insights, businesses can gain deeper

insights into the desires and anticipations of their intended audience, allowing for the creation of designs that effectively communicate the intended message and generate positive consumer responses.

Therefore, it can be said that the analysis of **Figure 5-19** and **Figure 5-20** highlights the vital role of design in marketing success. While a visually appealing design may initially seem promising, its effectiveness in generating traffic and sales is paramount. The integration of customer feedback, web analytics, and e-CRM facilitates the identification of design shortcomings and paves the way for improvements that resonate with the target audience. The case study demonstrates the impact of design choices on sales performance, underscoring the importance of investing time and resources in creating designs that effectively engage and convert potential customers.

## CHAPTER 6

### RESEARCH LIMITATION, OPPORTUNITIES FOR FUTURE RESEARCH AND CONCLUSION

#### **6.0 Research Limitation, Opportunities for Future Research and Conclusion of Research**

##### **6.1 Research Limitation**

When considering the integration of e-CRM with web analytics for SMEs in Malaysia, it is crucial to acknowledge the limitations that may arise. These limitations can have an impact on the effectiveness and efficiency of implementing a data-driven e-CRM model for active online engagement. By understanding these limitations and addressing them proactively, SMEs can optimize their web analytics and e-CRM integration efforts to achieve better results.

One of the limitations to be aware of is the complexity of data integration. Integrating web analytics and e-CRM involves consolidating and synchronizing data from various sources. This process poses difficulties, especially with large data sets from different platforms and systems. SMEs need to invest time and resources in ensuring the accuracy, consistency, and compatibility of their data. By overcoming this limitation, SMEs can ensure that the integrated system functions smoothly, providing reliable insights for effective decision-making.

Another limitation relates to the quality of data. The success of web analytics and e-CRM integration depends heavily on the precision and entirety of the data collected. However, data quality issues such as incomplete or inconsistent data can compromise the reliability and validity of the analysis. SMEs should prioritize data quality management practices, including addressing technical errors, minimizing data entry mistakes, and understanding the impact of user behaviour on data quality. By ensuring high-quality data, SMEs can make informed decisions based on reliable insights from their integrated system.

Privacy concerns are also a limitation to consider. The integration of web analytics and e-CRM involves the collection and analysis of customer data, which raises privacy concerns. SMEs must adhere to applicable privacy regulations and establish suitable safeguards to safeguard customer data. Failing to address privacy concerns can lead to negative customer perceptions, loss of trust, and potential legal consequences. Therefore, SMEs need to prioritize to ensure data privacy and security measures are in place to uphold customer trust and confidence in online engagement initiatives.

The limited availability of skilled professionals is another challenge to overcome. To successfully integrate web analytics and e-CRM, SMEs require skilled professionals who possess technical expertise as well as a deep understanding of marketing and customer relationship management. However, there is a shortage of individuals with such



multidisciplinary skills. SMEs should allocate resources to training and development programs aimed at improving the skills of their current workforce or explore outsourcing options to bridge the skills gap with specialized expertise. By addressing this limitation, SMEs can leverage the full potential of web analytics and e-CRM integration.

Integration challenges between different systems and platforms can also hinder the effectiveness of web analytics and e-CRM integration. Many SMEs utilize multiple systems and platforms for web analytics and e-CRM, and integrating these disparate systems can be complex. Compatibility issues, data synchronization problems, and lack of standardization can impede seamless integration. SMEs should evaluate their existing systems and platforms, identify integration challenges, and work towards streamlining and harmonizing their technological infrastructure. By addressing integration challenges, SMEs can ensure smooth communication and data flow, enhancing the effectiveness of their integrated system.

Additionally, the dynamic nature of technology and customer behaviour presents a continuous challenge. Technology evolves rapidly, and customer preferences change over time. This dynamic environment requires SMEs to adapt and update their analytics and CRM systems to stay relevant. SMEs should stay informed about emerging technologies, platforms, and channels, and proactively incorporate them into their integrated system. By staying up-to-date and agile, SMEs can capitalize

on technological advancements and meet changing customer expectations.

A holistic organizational approach is crucial for successful web analytics and e-CRM integration. It is not merely a technological endeavour but involves people, processes, and organizational culture. SMEs need to foster a data-driven mindset among their employees, establish clear processes for data collection and analysis, and promote cross-functional collaboration. Resistance to change, lack of organizational support, and siloed structures can hinder integration efforts. SMEs should prioritize change management and create a culture that embraces data-driven decision-making and collaboration across departments. By adopting a holistic approach, SMEs can maximize the benefits of web analytics and e-CRM integration.

Furthermore, the generalizability of research findings is a limitation to be aware of. Much of the research on the integration of web analytics and e-CRM focuses on specific industries, contexts, or sample sizes. The applicability and generalizability of these findings to other industries or organizations may be limited. Therefore, there is a need for more diverse and comprehensive research to provide a broader understanding of the integration's effectiveness across different contexts. SMEs should consider their unique industry and contextual factors when implementing web analytics and e-CRM integration, adapting best practices to suit their specific needs.

Lastly, the financial investment required for integration can be a limitation, particularly for smaller organizations with limited financial resources. Implementing and maintaining integrated web analytics and e-CRM systems involve expenses related to technology infrastructure, software licenses, data management, training, and ongoing maintenance. SMEs should carefully evaluate their budgetary constraints and prioritize investments that align with their strategic goals. Exploring cost-effective solutions, seeking partnerships, or leveraging government initiatives can help SMEs overcome financial limitations and fully embrace web analytics and e-CRM integration.

## **6.2 Opportunities for Future Research and Conclusion**

### **6.2.1. Opportunities for Future Research**

The integration of e-CRM and web analytics marks a significant stride in enhancing businesses' understanding of customer behaviours and preferences in the digital realm. As we conclude this study, it is essential to acknowledge the potential avenues for future research in this dynamic and evolving field.

- a. **Advanced Analytics Techniques:** Future research can delve deeper into advanced analytics techniques within the integrated framework. Exploring machine learning, artificial intelligence, and predictive analytics could unveil new dimensions for understanding and predicting customer interactions and trends.

- b. **Personalization Strategies:** Investigating more personalized and targeted strategies within the integrated e-CRM and web analytics framework could be a promising avenue. Understanding how businesses can tailor their interactions based on individual customer data and preferences is crucial for effective engagement.
  
- c. **Cross-Channel Integration:** The contemporary digital landscape involves multiple channels of interaction. Future research can explore how the integration of e-CRM and web analytics can seamlessly extend to encompass various channels, ensuring a cohesive and unified customer experience.
  
- d. **Long-Term Impact Analysis:** Assessing the long-term impact of implementing integrated e-CRM and web analytics solutions is essential. Future research can investigate how sustained adoption influences customer loyalty, business performance, and competitive advantage over time.
  
- e. **Technological Advancements:** With the rapid evolution of technology, future research can explore how emerging technologies, such as blockchain or augmented reality, may intersect with integrated e-CRM and web analytics to redefine customer engagement strategies.

### 6.2.2. Conclusion of Research

The integration of web analytics with e-CRM offers several advantages for SMEs in Malaysia. Among the advantages are:

- a. **Holistic Customer Insights:** Integrating web analytics with e-CRM provides a more comprehensive view of customer behaviour and interactions. web analytics data, such as click-through rates, website visits and conversion rates, can be combined with e-CRM data, including customer profiles, purchase history, and support interactions. This integration enables businesses to gain deeper insights into customer preferences, engagement patterns, and the effectiveness of marketing campaigns.
- b. **Personalization and Targeting:** By leveraging the combined data from web analytics and e-CRM, businesses can create highly personalized experiences for customers. They can segment customers based on their behaviour, preferences, and purchase history to deliver targeted marketing messages, product recommendations, and tailored offers. This degree of customization improves customer contentment, involvement, and the probability of conversion.
- c. **Enhanced Customer Service:** Integration of web analytics with e-CRM enables businesses to provide proactive and contextually relevant customer support. By analysing web analytics data, such as browsing behaviour or abandoned carts, businesses can identify customers who may need assistance and provide timely support. This integration also allows customer support agents to access

relevant customer data from the e-CRM system, helping them provide more personalized and efficient support.

- d. **Improved Sales and Conversion Optimization:** By integrating web analytics with e-CRM, businesses can track and examine the complete customer experience from the initial website exploration to the ultimate purchase. This enables them to identify potential drop-off points or bottlenecks in the conversion process and implement targeted strategies to optimize sales funnels. By understanding customer behaviour and preferences, businesses can refine their marketing efforts, optimize website usability, and improve conversion rates.
- e. **Seamless Data Flow and Automation:** Integration between web analytics and e-CRM systems eliminates manual data entry and ensures a seamless flow of data between the two platforms. This automation saves time, reduces errors, and allows businesses to focus on data analysis and decision-making rather than administrative tasks. It also facilitates real-time or near-real-time updates between systems, enabling businesses to respond quickly to customer interactions and market trends.

Overall, integrating web analytics with e-CRM systems empowers businesses with valuable customer insights, enables personalized experiences, improves customer service, enhances sales and conversion optimization, and streamlines data flow and automation. This integration facilitates data-driven decision-making and enables businesses to build stronger, more profitable customer relationships.

## 7.0 References

- [1] A. N. M. N. L. D. F. Z. Rana Saifullah Hassan, "Effect of Customer Relationship Management on Customer Satisfaction," *Procedia Economics and Finance*, vol. 23, pp. 563-567, 2021.
- [2] Ö. Ç. M. Yaman Öztekin, "Customer Preferences of Multichannel Operations in the Context of Omnichannel World," *Managing Customer Experiences in an Omnichannel World: Melody of Online and Offline Environments in the Customer Journey*, 2022.
- [3] M. A. Camilleri, "The use of data-driven technologies for customer-centric marketing," *International Journal of Big Data Management*, vol. 1, p. 50, 2020.
- [4] A. Cheong, "Improving conversion rates through marketing analytics," *Optimization*, 6 August 2019.
- [5] A. I. Tolulope, "Descriptive Analytics Tools," in *Data Science and Analytics for SMEs: Consulting, Tools, Practical Use Cases*, Berkeley, CA, Apress, 2022, pp. 83--111.
- [6] N. M. N. A. Che Mohd Zulkifli Che Omar, "Factors Affecting the Success of Bumiputera Entrepreneurs in Small and Medium Enterprises (SMEs) in Malaysia," *The International Journal of Management Science and Business Administration*, vol. 1, pp. 40-45, 2015.
- [7] W. S. H. H. A. R. Enylin Nordin, "Rescuing Malaysian SMEs: Government Financial And NonFinancial Supports During Covid 19 Outbreak," *International Journal of Academic Research in Business and Social Sciences*, vol. 12, no. 11, p. 273 – 288, 2022.
- [8] M. A. A. N. A. L. A. f. M. Hafiz Yusoff, "Evaluation on Customer Satisfaction in Using E-Commerce Platforms: Malaysia as A Case Study," *International Journal of Engineering Trends and Technology*, pp. 32-37, 2020.
- [9] F. A. Latifa Trabelsi, "Data Mining for CRM: Extracting Customer Knowledge From Data," in *Social Customer Relationship Management (Social-CRM) in the Era of Web 4.0*, Einbeck, Germany, Business Science Reference, 2022, pp. 169-195.
- [10] T. D. A. I. G. Rivin Sutrisno, "Can SMEs Capture the Social Media Phenomenon?: CRM Strategies to Improve Relationship Performance," in *Proceedings of the International Seminar of Science and Applied Technology (ISSAT 2020)*, Bandung (Video Conference), 2020.
- [11] M. Janakova, "Automation of Marketing Processes and the Discovery of Knowledge for CRM," in *Encyclopedia of Organizational Knowledge, Administration, and Technology*, Hershey, Pennsylvania, United States, Business Science Reference, 2021, pp. 2086-2094.
- [12] P. Yürük-Kayapınar, "Examination of Empirical Studies on Customer Engagement, Online Engagement, and Social Media Engagement," in *Insights, Innovation, and Analytics for Optimal Customer Engagement*, Hershey, Pennsylvania, United States, Business Science Reference, 2021, pp. 25-48.
- [13] A. I. Tolulope, *Data Science and Analytics for SMEs*, New York: Apress Berkeley, CA, 2022.
- [14] E. R. & P. I. Paul Harrigan, "Critical factors underpinning the e-CRM activities of SMEs," *Journal of Marketing Management*, vol. 27, no. 5-6, pp. 503-529, 2011.
- [15] N. M. M. H. N. H. A. Siti Hasnah Hassan, "Social customer relationship management (s-CRM) among small- and medium-sized enterprises (SMEs) in Malaysia," *International Journal of Ethics and Systems*, vol. 35, no. 2, pp. 284-302, 2019.
- [16] Y. S. Q. I. S. Y. Rizwan Ullah Khan, "The Impact of Customer Relationship Management and Company Reputation on Customer Loyalty: The Mediating Role of Customer Satisfaction," *Journal of Relationship Marketing*, vol. 21, no. 1, pp. 1-26, 2020.
- [17] S. G. K. Tarinmoy Das, "Customer Relationship Management in a Data-Driven World: Leveraging Data Mining Tools," *Data Science and Intelligent Computing Techniques*, pp. 227-233, 2023.

- [18] I. R. Enny Khurniasari, "The Effect of e-CRM and technological innovation toward customer loyalty: A mediation effect of customer experience on Tokopedia customer," *Journal of Theoretical and Applied Information TEchnology*, vol. 99, no. 22, pp. 5312-5322, 2021.
- [19] L. Sadath, "Data Minig in E-Commerce: A CRM Platform," *International Journal of Computer Applications*, vol. 68, no. 24, pp. 32-37, 2013.
- [20] J. S. a. Z. M. Mukhlis Yunus, "Digital marketing, online trust and online purchase intention of e-commerce customer: Mediating the role of customer relationship management," *International Journal of Data and Network Science*, vol. 6, no. 3, pp. 935-944, 2022.
- [21] V. K. a. O. G. Ayodeji, "Web analytics applications, opportunities and challenges to online retail in India," *International Journal of Services and Operations Management*, vol. 41, no. 4, pp. 463-485, 2022.
- [22] S. A. a. C. Rossi, "An analytical model for comparing the profitability of competing online marketing channels: Search engine marketing versus e-commerce marketplace," *Journal of Marketing Theory and Practice*, vol. 29, pp. 534 - 549, 2021.
- [23] A. M. Miroslav Reiter, "Google Analytics best Practices in online business," in *EBES Conference 38th*, Warsaw, Poland, 2022.
- [24] Y. Wang, "Understanding E-CRM: A Literature Review and Research Agenda," *Journal of Relationship Marketing*, vol. 20, no. 1, p. 1–22, 2021.
- [25] N. A. & N. Almarzoogi, "The Role of E-CRM in Improving Customer Satisfaction: The Mediating Role of Customer Trust," *Journal of Marketing Analytics*, vol. 10, no. 1, p. 28–4, 2022.
- [26] I. C. & Y. Chen, "Enhancing E-CRM Performance: The Role of Social Media Marketing," *Journal of Organizational and End User Computing*, vol. 32, no. 4, p. 18–33, 2020.
- [27] D. W. X. L. L. H. & L. H. X. Li, "The Impact of Web Analytics on E-CRM: Evidence from China's Hotel Industry," *Journal of Hospitality and Tourism Technology*, vol. 12, no. 2, p. 252–267, 2021.
- [28] M. Sandelowski, "Combining Qualitative and Quantitative Sampling, Data Collection, and Analysis Techniques in Mixed-Method Studies," *Research in Nursing & Health*, vol. 23, no. 3, pp. 246-255, 2000.
- [29] P. N. Carolyn Boyce, "CONDUCTING IN-DEPTH INTERVIEWS: A Guide for Designing and Conducting In-Depth Interviews for Evaluation Input," Pathfinder International, Watertown, USA, 2006.
- [30] P. Gončarovs, "Data Analytics in CRM Processes: A Literature Review," *Information Technology and Management Science*, vol. 20, pp. 103 - 108, 2017.
- [31] J.-H. W. E.-P. L. S.-Y. H. Jaideep Srivastava, "A Case for Analytical Customer Relationship Management," in *Advances in Knowledge Discovery and Data Mining, 6th Pacific-Asia Conference, PAKDD 2002*, Taipei, Taiwan, 2002.
- [32] M. I. Alhojailan, "Thematic Analysis: A Critical Review of its Process and Evaluation," *West East Journal of Social Sciences*, vol. 1, no. 1, pp. 39-47, 2012.
- [33] L. P. L. C. R. K. S. S. Luigi Pio, "The Impact Of Customer Relationship Management On Customer Satisfaction And Retention: The Mediation Of Service Quality," *Türk Fizyoterapi ve Rehabilitasyon Dergisi/Turkish Journal of Physiotherapy and Rehabilitation*, vol. 32, pp. 22107-22121, 2021.
- [34] D. H. D. S. N. A. E. M. Yogi Sugiarto Maulana, "An Analysis of Customer Satisfaction and Its Effect on Customer Relationship Management," in *1st Paris Van Java International Seminar on Health, Economics, Social Science and Humanities (PVJ-ISHESSH 2020)*, Bandung, Indonesia, 2020.
- [35] S. McCombes, "Survey Research | Definition, Examples & Methods," Learneo, Inc., 22 June 2023. [Online]. Available: <https://www.scribbr.com/methodology/survey-research/>. [Accessed 12 December 2023].
- [36] D. D. N. N. A.N. Rahmadi, "The Effect of Customer Relationship Management (CRM) and Entrepreneurship Orientation Towards the Company Performance in Micro Small



Medium Enterprises in Kediri,” in *Proceedings of the 2nd International Conference on Business and Management of Technology (ICONBMT 2020)*, Online Conference, 2020.

[37] O. Dastane, “Impact of Digital Marketing on Online Purchase Intention: Mediation Effect of Customer Relationship Management,” *Journal of Asian Business Strategy, Asian Economic and Social Society*, vol. 10, pp. 142-158, 2020.

[38] J. v. Bleichert, “Web Analytics Comparison: Most Popular Web Analytics Tools in 2023,” *EXPERTE.com*, 6 June 2023. [Online]. Available: <https://www.experte.com/create-a-website/website-analytics>. [Accessed 10 June 2023].

## 8.0 Appendices

### 8.1 Public Service Innovation Awards 2019 – Silver Award



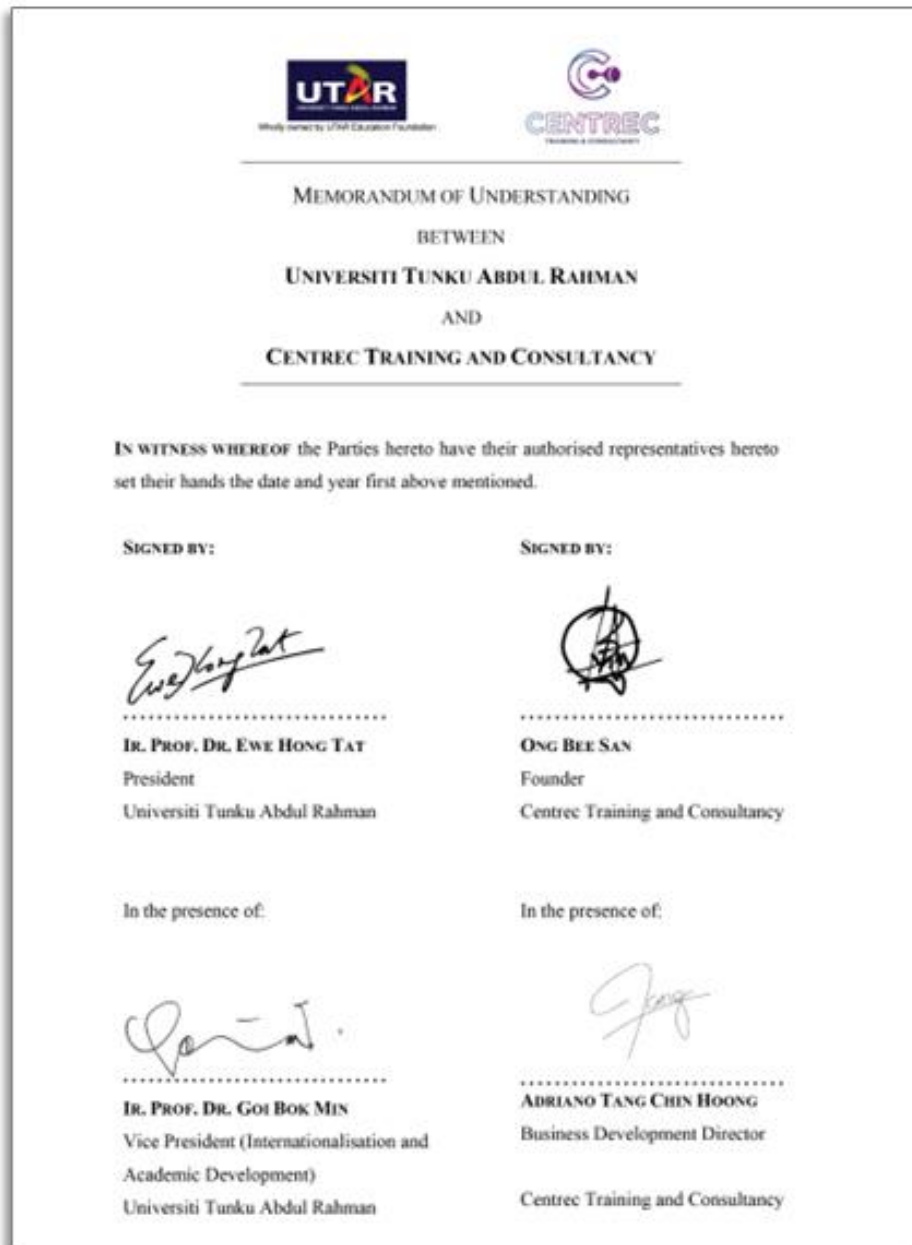
The working model was first introduced at the Malaysia Technology Expo. Since then, the working model is widely used in several SMEs from various industries such as F&B and e-commerce.

## 8.2 Appreciation Letter from DietChain Sdn. Bhd.



The working model was implemented within DietChain (M) Sdn. Bhd. and it has enabled it to glide through the COVID-19 pandemic and boosting its sales almost immediately after the COVID-19 pandemic.

### 8.3 MoU Between UTAR and CENTREC



MoU is signed between CENTREC and UTAR following the success of the marketing campaign conducted by CENTREC with the use of the working model for the Faculty of Information and Communication Technology (FICT) for its new degree program (Bachelor of Information Systems (Honours) Digital Economy Technology).