

FACULTY OF TECHNOLOGY MANAGEMENT AND TECHNOPRENEURSHIP

ROLE OF TECHNOPRENEURS IN DEVELOPING INNOVATION OF SMART MARKETING

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DECLARATION

I declare that this thesis entitled "THE IMPACT OF SME PROMOTIONAL ACTIVITIES ON CONSUMER ENGAGEMENT: A CUSTOMER PERSPECTIVE ANALYSIS" is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.



APPROVAL

I hereby declare that I have checked this report entitled "THE IMPACT OF SME PROMOTIONAL ACTIVITIES ON CONSUMER ENGAGEMENT: A CUSTOMER PERSPECTIVE ANALYSIS" and in my opinion, this thesis it complies the partial fulfillment for awarding the award of the degree of Bachelor of Technology Management (High Technology Management) With Honours.

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ABSTRAK

The positive perception of educational institutions is examined in this study in relation to marketing tactics, technological use, inclusive education policy, and industrial sector engagement. Using the SmartPLS methodology and statistical analysis, the results show that the institution's reputation in the educational field is greatly impacted by responsive marketing tactics, efficient use of technology, inclusive policies, and collaborations with the industry sector. This study revealed that the use of technology plays a critical role in creating a positive institutional image (T-statistics: 11.735), and that market-responsive marketing techniques have a considerable impact on the positive institutional image (T-statistics: 13.197). The institution's image is further enhanced by inclusive education policies and industry sector partnership (Inclusive Education Policy - Positive Image, T-statistics: 5.928; partnership with Industry Sector - Positive Image, T-statistics: 8.834). The findings of the study validate the significance of employing sophisticated technology and adaptive marketing tactics to cultivate a favourable public perception of educational establishments. Institutions of higher learning can fulfil stakeholder expectations for the services they deliver by fortifying these variables. This study makes a substantial contribution to our understanding of the variables affecting educational institutions' reputations and offers tactical advice for enhancing their image in a way that is more appropriate and positive.

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INTRODUCTION

In our world of rapidly globalising economies, scientific and technological advancements happen instantaneously, and knowledge is seen as a fundamental skill for building wealth (Lalkaka, 2002). Science and technology have praised land, labour, and money as sources of wealth in the latter part of the 20th century (Etzkowitz, 2003a). Thus, it has been acknowledged that creativity and knowledge are production factors (O'Shea, Allen, Morse, O'Gorman, & Roche, 2007).

The IT industry could benefit from the art of entrepreneurship by fostering knowledge and creativity. In this setting ,therefore. What is the best method to harness knowledge and innovation? becomes the question. The internet's rise has made the information age a prime location for business opportunities. The swift one The previous fifty years have seen a significant advancement in technology, which has greatly impacted our daily life. Organisational processes are developed and supported by information technology (IT) on a competitive worldwide scale. Another important trend is the movement of more everyday activities into the electronic sphere, such as the transition from the physical to the virtual world.

CHAPTER 1 INTRODUCTION

1.1 Intoduction

The goal of this study is to investigate how the current digital era's rapid technical growth has led to significant changes in the marketing environment. Leading this trend is technopreneurship, which is the innovative fusion of technology and entrepreneurship. Smart marketing is largely determined by technopreneurs, or people who employ new technology to start and expand their own enterprises.

1.2 Backgroud Of Study

Technopreneurs' creative ideas are essential to smart marketing, which employs automated processes, tailored customer interactions, and data-driven strategies. The significance of technopreneurship in promoting innovation in the realm of smart marketing is examined in this introduction. It examines the strategies employed by technopreneurs to spot market niches, come up with original solutions, and subvert accepted marketing myths. Through case study research and real-world examples, this debate highlights the significance of creating an innovative culture within the corporate sector and the revolutionary impact of technopreneurial efforts on marketing strategies. Using this perspective, we can clearly see how technopreneurship is transforming marketing and assisting businesses in thriving in a technologically competitive and increasingly complex market.

The fast changing digital era, in which technology is omnipresent in all areas of life, including tourism and cultural preservation, provides a backdrop for this study. Smart marketing, which is defined by the use of data-driven strategies, personalised consumer interactions, and automation, has become the new standard for organisations looking to stay competitive. In this context, technopreneurship emerges as a key driver of innovation.

Technopreneurs, who combine the spirit of entrepreneurship with cutting-edge technology, are spearheading the movement to transform heritage marketing techniques. They use technology like augmented reality (AR), the Internet of Things (IoT), big data analytics, and artificial intelligence (AI) to create more compelling and successful heritage marketing

solutions. Their activities challenge traditional marketing approaches and set new standards for customer service and user experience in the heritage industry.

The present Investigation was conducted during a momentous shift from conventional to sophisticated heritage marketing. It examines how technopreneurs identify and grab hold of business opportunities and how their inventions change how historical places interact with their patrons. By focusing on case studies and real-world examples, this study highlights the important impact of technopreneurship in a fiercely competitive and technologically sophisticated heritage marketing context.

Additionally, this study explores the challenges that technopreneurs face along the route, including fierce competition, quick technical breakthroughs, and the need for constant adaptation. This background helps us to better appreciate the critical role technopreneurs will play in influencing smart heritage marketing going forward and encouraging continued innovation in the field.

1.3 Problem statement

The primary obstacle that technopreneurs encounter when creating innovative heritage apps is how to seamlessly incorporate cutting-edge technologies like augmented reality (AR) and data analytics to offer users immersive and educational experiences while maintaining the authenticity and cultural significance of heritage sites. This calls for resolving user interface issues, overcoming data accessibility constraints, and handling technical complexity. In order to promote acceptance and adoption of these creative solutions, technopreneurs must also negotiate legal frameworks, allay privacy concerns, and interact with stakeholders. This will ultimately improve heritage tourism and safeguard cultural heritage for future generations.

First sub problem is Technical Integration Challenge: When incorporating cutting-edge technology like augmented reality (AR) and data analytics into legacy apps, technopreneurs face considerable challenges. The difficulty of seamlessly integrating various technologies to provide users with an engaging and educational experience while maintaining the authenticity and cultural relevance of heritage sites is the root of this problem. Technopreneurs have to handle technical challenges to ensure seamless operation, simple user interface, and correct

portrayal of historical content in the app. This difficulty is further increased by the need to optimise performance across a range of hardware and operating systems, which necessitates rigorous testing and improvement to ensure compatibility and dependability.

Second sub problem is Regulatory Compliance and Stakeholder involvement: When creating clever marketing strategies for legacy apps, technopreneurs must overcome obstacles related to stakeholder involvement and regulations. A close examination of the law and industry norms is necessary while navigating regulatory frameworks pertaining to data privacy, intellectual property rights, and cultural preservation. Furthermore, it is imperative to involve stakeholders such as regulatory organisations, local communities, and managers of heritage sites in order to guarantee the acceptance and adoption of the creative app solutions. Crucial components of this process include establishing trust, resolving issues with data security and cultural representation, and encouraging cooperation amongst many parties. To overcome these obstacles and produce heritage apps that improve tourist experiences while preserving cultural heritage for future generations, we need strategic alliances, effective communication, and a dedication to moral and responsible innovation.

1.4 RESEARCH QUESTION

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- RQ1. What is innovation in smart marketing?
- **RQ2.** How does the technopreneur play the role in innovation for smart marketing?
- RQ3. How far can the technopreneurs develop innovation in smart marketing?

1.5 RESEARCH OBJECTIVE

RQ1. To determine relationship between role of technopreneurs and developing innovation of smart marketing

RQ2. To observe the role of technopreneurs in innovation of smart marketing.

RQ3. To investigate the most important role of technopreneurs who

can develop innovation in smart marketing.

1.6 Scope Of Study

This study closes a knowledge gap about the role technopreneurs play in fostering innovation in smart marketing, especially when it comes to the development of heritage apps.

The theory's shortcoming is its scant examination of the unique function of technopreneurs in utilising cutting-edge technologies to improve marketing tactics, particularly in the heritage app industry. Although the literature now in publication recognises the role technopreneurship plays in innovation and the significance of technology in marketing, it does not provide a thorough examination of how technology is applied in the legacy app space. The study intends to shed light on the particular potential, problems, and tactics associated with integrating smart marketing technologies into legacy app development by concentrating on this particular niche market. Research like [Arefin, M. R. (2019)](insert reference), which addresses technopreneurs' overall role in marketing innovation but skips over how they might use it in heritage app situations, clearly illustrates this gap.

Policymakers, technopreneurs, and managers of heritage sites who are interested in the promotion and preservation of cultural heritage will find great insight from this study. The research intends to enable stakeholders to make knowledgeable decisions and maximise their efforts by identifying successful tactics, best practices, and potential pitfalls in creating creative smart marketing solutions for heritage apps. In particular, technopreneurs can learn how to successfully incorporate clever marketing strategies into heritage app development projects, and managers of heritage sites can learn how to use technology to improve visitor engagement and educational experiences. The ethical and legal issues related to technology use in cultural heritage settings may be useful to policymakers in order to promote ethical and sustainable innovation in the sector.

It is envisaged that by the end of this project, stakeholders in heritage apps will have the information and resources needed to fully utilise technopreneurship to protect and promote cultural heritage while improving visitor experiences and engagement.

1.7 Limitations Of Study

In the context of legacy applications, this study will concentrate on certain facets of the role that technopreneurs play in creating innovation in smart marketing. What will be included and not included in the research is outlined in the following delimitations:

- Technopreneurship Perspective: The research will only look at technopreneurs' inventions and business endeavours in the field of heritage app smart marketing. This covers their tactics, difficulties, and input on the creation of creative marketing solutions.

- Heritage App Industry: The research will focus on this sector and examine how clever marketing approaches are developed, executed, and received in this industry. It will look at how technopreneurs use technology to improve tourism and advance cultural heritage.

- Qualitative Methodology: To obtain a thorough understanding of the experiences and viewpoints of technopreneurs, the study will make use of qualitative research techniques such case studies, interviews, and content analysis. This methodology facilitates a sophisticated investigation of their inventive methodologies and the variables impacting their decision-making procedures.

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1.8 Significant Of Study

Key definitions that are necessary to comprehend the suggestion on the role of technopreneurs in creating innovation in smart marketing are provided in this section: Technopreneurs: Technopreneurs are those who combine technological know-how with entrepreneurial spirit to develop novel solutions and promote them. Their ability to spot possibilities, make the most of technology, and handle the difficulties of launching and expanding technology-based firms define them.

Smart Marketing: To develop individualised, focused, and data-driven marketing strategies, smart marketers employ automation, data analytics, and cutting-edge technologies. It includes strategies to maximise marketing efforts and improve consumer engagement, including as AI-

driven customer segmentation, real-time personalised communications, and predictive analytics.

Innovation: As used in this proposal, the term "innovation" refers to the creation and application of novel concepts, procedures, or technological advancements that benefit users and further the development of astute marketing strategies in the legacy app sector. It encompasses both gradual advancements and revolutionary discoveries that provide a competitive edge.

Heritage apps: This is a smartphone programmes created with the intention of promoting, educating, and safeguarding cultural heritage locations, items, and experiences. These applications frequently make use of interactive maps, multimedia information, and augmented reality (AR) to improve visitor engagement and offer engaging educational opportunities.



This summarized the whole chapter 1 that cover the research introduction, study background, problem statement, research questions and objectives. This chapter also covers the study's significance, limitations and scope. Literature review will be explained in upcoming chapter that includes the main keywords in this study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The main challenge that technopreneurs encounter when creating creative legacy apps is examined in the literature study, with a focus on how to successfully incorporate cutting-edge technologies. The major issue and any related minor issues are addressed in this section's structure: The challenge of technical integration, stakeholder involvement, and regulatory compliance.

Context of the Issue

In the digital age, heritage applications are becoming indispensable resources for protecting and promoting cultural heritage. These applications combine cutting-edge technology, such as data analytics and augmented reality (AR), to give consumers engaging, instructive experiences. Technopreneurs creating these apps, however, have tremendous obstacles in integrating new technologies with authenticity and cultural relevance of heritage places intact. The main challenges faced by technopreneurs are the intricacies of successfully integrating modern technologies, as well as negotiating legal and regulatory frameworks and interacting with pertinent parties.

The Literature Review's Structure

The challenge of technical integration This section examines the research on the challenges technopreneurs have when incorporating augmented reality and data analytics into legacy software. Technical complexity, data accessibility, and user interface design are important issues. The review will look at best practices for getting past these technological obstacles as well as gaps in the current research and solutions.

Regulatory Compliance and Stakeholder Involvement: The regulatory issues and the necessity of stakeholder participation in the creation of legacy applications are the main topics of discussion in this section of the evaluation. It covers privacy issues, regulatory frameworks, and the value of involving local communities, cultural heritage authorities, and other stakeholders. The assessment will focus on the tactics technopreneurs employ to overcome these obstacles and encourage the acceptance and uptake of creative solutions.

2.2 Definition of topic or background discussion

In the current digital era, technopreneurship the fusion of technology with entrepreneurship is essential for fostering innovation and opening up new business prospects. Technopreneurs play a critical role in integrating cutting edge technology like data analytics, virtual reality (VR), and augmented reality (AR) into traditional business structures. These technology developments are used in the heritage app industry to improve the marketing tactics of cultural heritage sites by providing users with immersive, instructive, and entertaining experiences. At the vanguard of this change is smart marketing, which makes use of cutting-edge technologies to develop date driver personalised and sutemated marketing tactics.

technologies to develop data-driven, personalised, and automated marketing tactics. Smart marketing strategies used to heritage apps can greatly enhance user experience, educational outreach, and visitor engagement. However, there are a number of difficulties in integrating these technologies, such as impediments to regulation and technical complexity.

2.3 First sub-problem discussion heading

The first discussion session explores the main barrier that technopreneurs must overcome to create creative legacy apps: the Technical Integration Challenge. In order to give consumers engaging and instructive experiences, this challenge entails smoothly integrating cutting-edge technology like augmented reality (AR) and data analytics into legacy apps. Heritage sites must be integrated with high levels of utility and user interaction, all the while preserving their originality and cultural relevance.

Heritage applications provide rich and interactive content to improve the visitor experience at cultural and historical places. Users can interact with multimedia content, visualise historical reconstructions, and superimpose information onto real-world views in ways that are not possible with traditional means thanks to technologies like augmented reality (AR). By offering insights into user behaviour and preferences, data analytics may further personalise these experiences by enabling recommendations and bespoke content.

Nevertheless, there are a number of technological difficulties in integrating these technologies. Robust data management systems, high computing power, and complex algorithms are needed for augmented reality and data analytics. Furthermore, it is essential to preserve the authenticity and correctness of the historical content contained in these apps. Technopreneurs must carefully manage technical and ethical issues in order to strike a delicate balance between technology innovation and cultural preservation.

2.4 sub problem Technical Integration Challenge

The main hindrance that technopreneurs encounter while creating inventive legacy applications is the Technical Integration Challenge, which encompasses multiple crucial sub-issues. First and foremost, it's critical to create a simple and user-friendly interface that smoothly incorporates cutting-edge technology like augmented reality and data analytics. The UI needs to be aesthetically pleasing, usable by people with varying degrees of technical expertise, and encourage interaction by providing a seamless, immersive experience. Second, there are many difficulties in managing and making data accessible. To preserve historical and cultural authenticity, technopreneurs need to collect precise and thorough data from a variety of sources, combine diverse datasets into a coherent system, and guarantee data accuracy. Thirdly, the app's functionality and technological complexity are critical.

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Processing data in real-time for augmented reality apps calls for a significant amount of processing power and sophisticated algorithms. This means that performance must be optimised for various device types and scalability to accommodate changing user loads must be guaranteed. Ultimately, it's critical to preserve authenticity and cultural sensitivity. To create interesting yet respectful information, this calls for maintaining content accuracy, honouring cultural heritage and sensitivities, and working with historians, cultural specialists, and local communities. Technopreneurs can overcome the Technical Integration Challenge by tackling these sub-problems and developing inventive, culturally sensitive heritage apps that improve user experience while promoting and protecting cultural heritage.

2.4.1 Sub Problem Regulatory Compliance And Stakeholder Involvement

Stakeholder involvement and regulatory compliance are two major hurdles in developing creative heritage apps. Technopreneurs have to manoeuvre through intricate legal structures that protect intellectual property rights, data privacy, and cultural heritage. While adherence to data protection legislation such as the GDPR is essential for safe and transparent data handling methods, compliance with cultural heritage laws guarantees the respectful use of protected sites and artefacts. Furthermore, in order to prevent legal issues, getting the required permits for the use of protected assets is crucial. Involving stakeholders is equally important. Working together with authorities on cultural heritage assures compliance with preservation objectives and makes access easier.

By involving local communities, the app guarantees that their cultural narratives and values are reflected, promoting acceptance and authenticity. Consulting with archaeologists, historians, and cultural specialists improves the app's content's accuracy and instructional value. In order to guarantee that the app lives up to user expectations, customer feedback is also gathered during development to assist identify usability issues and areas for improvement. Technopreneurs can develop heritage apps that are generally acceptable, culturally sensitive, and consistent with the law by tackling these sub-problems. This strategy encourages the preservation and appreciation of cultural heritage while improving the app's efficacy and user experience.

2.5 Conclusion of Literature Review

The primary obstacle technopreneurs encounter when developing creative legacy apps has been explored in the literature review, with an emphasis on the effective fusion of cutting-edge technology. Developing user-friendly interfaces, controlling data accessibility, and resolving technological difficulties like real-time processing and performance optimisation are all part of the technological Integration Challenge. Furthermore, striking a balance between innovation and cultural sensitivity is necessary to preserve the authenticity and cultural value of heritage content while utilising technology like augmented reality and data analytics.

Stakeholder involvement and regulatory compliance are just as important as technological obstacles. Technopreneurs have to negotiate legal frameworks pertaining to intellectual

property rights, data privacy, and cultural heritage. They must ensure compliance to stay out of trouble with the law and foster goodwill. It is imperative to involve stakeholders, such as cultural authorities, local communities, historians, and users, in order to guarantee that the content of the app is precise, considerate of cultural differences, and broadly embraced.

The integration of advanced technologies with historic apps presents a complex problem that demands technopreneurs to possess a combination of technical proficiency, legal competence, and cultural awareness. Heritage apps that improve user experiences and encourage the preservation and enjoyment of cultural heritage can result from successfully addressing these issues. The effective development of legacy apps requires a comprehensive strategy that combines technological innovation with an awareness of cultural and legal settings, as this review emphasises.



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CHAPTER 3: METHODOLOGY

3.1 Research Design

To better comprehend the viewpoints and experiences of technopreneurs in creating smart marketing innovations, the research uses a qualitative methodology. In-depth understandings and thorough explanations of the things being studied are sought after by this method. To get detailed information, methods including content analysis, interviews, and case studies are used in combination. While interviews offer firsthand knowledge from the participants, case studies enable a thorough analysis of prosperous technopreneurs. The context and background information provided by content analysis of pertinent papers and publications serve as a supplement to these primary data sources.

3.2 Data Collection Methods

Semi-structured interviews, case studies, and document analysis are the main methods used for gathering data. Technopreneurs are questioned in semi-structured interviews to elicit specifics regarding their jobs, difficulties, and smart marketing tactics. To guarantee accuracy and enable thorough analysis, these interviews are taped and transcriptions are made. In case studies, prosperous technopreneurs are chosen, and their tactics, obstacles, and results in astute marketing innovations are examined. Examining pertinent papers, journals, and publications is part of the document analysis process; it provides context for the conclusions drawn from case studies and interviews.

3.3 Data Analysis

Using content and theme analysis methodologies, the data gathered from case studies, document analysis, and interviews is methodically examined. To find recurrent themes, patterns, and correlations in the qualitative data, content analysis entails coding and categorising the data. This approach facilitates the methodical organisation of the data and the derivation of insightful conclusions. The data is then interpreted using thematic analysis, which helps to pinpoint important themes about the functions and efficacy of technopreneurs in smart

marketing innovation. The thorough investigation of the qualitative data is ensured by this dual method.

3.4 Validation and Reliability

Many tactics are used to guarantee the authenticity and trustworthiness of the research findings. By comparing data from several sources and techniques, including case studies, document analysis, and interviews, triangulation is used to cross-verify information. This contributes to confirming the findings' consistency and accuracy. Furthermore, a peer review process is carried out whereby proficient professionals in the subject examine the research process and results, offering valuable insights and verifying the methodology's resilience. These actions are essential to proving the validity and dependability of the study findings.

Technical Integration Challenge

An important component of this research is addressing how cutting-edge technology like augmented reality and data analytics may be incorporated into clever marketing campaigns. This entails handling the needs for real-time processing, user interface design, and data accessibility. The goal of this study is to better understand these issues and offer technopreneurs useful strategies for implementing smart marketing innovations.

Regulatory Compliance and Stakeholder Involvement

The creation of clever marketing innovations requires careful attention to pertinent legislation, such as data privacy rules, and the involvement of stakeholders, such as cultural authorities and local communities. The significance of stakeholder engagement and regulatory compliance in boosting the legitimacy and acceptance of marketing innovations is emphasised by this study. Following these recommendations will help the research create a thorough and reliable approach that technopreneurs can use to execute smart marketing tactics successfully.

3.5 Sampling Design

In this study, a basic random sampling design was used to choose a representative sample of technopreneurs and visitors to heritage sites from the intended demographic. The selection approach selected was chosen due to its ability to guarantee a representative and wide sample. The researcher set out to document the differences in visitor engagement and inventive methods used by technopreneurs across a range of demographic groups. This covers a range of age 26-35. 36-45. 46-50, and ranges, specifically over 51 vears old. Based on the sample size criteria and the size of the intended audience, 210 individuals made up the sample size. A sample size of 210 ensures a fair representation and a diversity of opinions and experiences, especially considering the growing number of technopreneurs in the digital heritage sector and the general interest in cultural sites. The results are more likely to be representative of the overall population thanks to this sample size.

The goal of the study was to gather information that fairly represented both the creative tactics used by technopreneurs and the degree of interaction that visitors to cultural sites had with heritage apps. All members of the public were able to participate equally in this way by employing simple random sampling, which made it possible to identify any parallels or variations in the approaches used by technopreneurs and the answers they received from visitors of different ages. With this method, important conclusions on how technopreneurial innovations affect visitor participation and engagement in the cultural sector can be made.

3.6 Research Technique

Because it is a quantitative tool that enables statistical and numerical analysis, the questionnaire approach was selected for this study. By distributing questionnaires to tourists at historical sites who had engaged with heritage applications created by technopreneurs, the researcher hoped to gather information that would be useful for analysis. A questionnaire, according to Saunders (2019), is a phrase used to describe any data gathering methods in which participants are requested to respond to the same set of questions in a predefined order.

Respondents were able to provide standardised and structured answers to the questionnaire's significant, closed-ended questions. The purpose of the questions was to gauge both the degree of visitor pleasure and engagement as well as the efficacy of smart marketing techniques applied through heritage applications. Because the questionnaire was created with care and is easy to understand, respondents were able to finish it in around five minutes.

This approach is especially suitable for this study since it facilitates rapid data gathering from a moderate number of participants and fits in well with the popular usage of heritage applications among tourists. Because the questionnaire is constructed in a way that makes it easier to analyse visitor response patterns and trends, it offers insightful information about how technopreneurial innovations affect tourist engagement at cultural sites.

3.6.1 Questionnaire Design

The study's questionnaire contained closed-ended questions intended to elicit consistent answers from participants. The questions were designed to address a range of topics related to the heritage app experience, such as:

Use Frequency: The number of times users access the historical app.

User Experience: The app's navigability and ease of use.

Engaging Features: Features (such augmented reality and interactive maps) that increase visitor engagement.

Levels of Satisfaction: Their general level of satisfaction with the app and how it affected their visit.

Promotional Impact: The way the app affected their choice to go to the historical site.

Before being sent to a larger sample, the questionnaire underwent a pre-testing phase with a limited cohort of visitors to heritage sites to verify its clarity and applicability. The questions were designed to be constructed in such a way that the data collected could be readily analysed to make meaningful conclusions about how well the heritage applications enhanced visitor happiness and engagement.

3.7 Research Strategy

As it guarantees the continuity and coherence of the research process and supports the collection of findings, the research plan is an essential part of this study. Among the many approaches that were accessible, the survey strategy was used for this study. Surveys can offer greater insights and a more thorough comprehension of visitors' viewpoints on clever marketing tactics in heritage apps, which is why this method was chosen. A survey strategy, according to Saunders (2019), is quite easy to explain and comprehend, and the general public views it as credible. The goal of surveys is to learn more about people's attitudes and behaviours regarding a given topic.

Structured observations, structured interviews, and questionnaires are some of the data collection methods used in this strategy. The investigator sought to comprehend how users interpreted the astute marketing elements of historical apps and how these elements affected their pleasure and involvement. The rationale behind selecting this strategy was its compatibility with the goals and research questions of the study.

3.7.1 Pearson's Correlation Coefficient Analysis

The respondents were personally given questionnaires as part of the study. The survey's questions were thoughtfully crafted to guarantee that respondents could understand them with ease. To make sure they worked, a pilot test of the questionnaires was conducted with a sample of twenty people. By identifying any problems with the questions, this pilot test made sure that the goals of the research were appropriately addressed.

r value	Interpretation
0.81 -1.00	Very Strong
0.61 - 0.80	Strong
0.41 - 0.60	Moderate
0.21 - 0.40	Low
0.0 - 0.20	Very Low

Table 3.1: Pearson Correlation Coefficient

3.7.2 Cronbach's Reliability Analysis

The reliability and internal consistency of the measuring scales employed in the questionnaire will be assessed using Cronbach's Alpha analysis. With this approach, the intended qualities are correctly measured and the elements on each scale are guaranteed to be related to one another. Cronbach's Alpha will be used in this investigation to assess the accuracy of the data gathered and ascertain the strength of correlations.

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Cronbach's Alpha Coefficient	Internal Consistency	
$\alpha \ge 0.9$	Excellent	
$0.7 \le \alpha < 0.9$	Good	
$0.6 \le \alpha < 0.7$	Acceptable	
$0.5 \le \alpha < 0.6$	Poor	
α < 0.5	Unacceptable	

Table 3.2: Cronbach's Correlation Coefficient

3.8 Research Framework

The research framework outlines the systematic approach taken to achieve the research objectives. It involves an exploratory research design and employs both quantitative and qualitative methodologies to gather and analyze data.

Research Objectives

To determine the roles of promotional activities on consumer engagement in SMEs.

To examine the impact of promotional activities on consumer engagement.

To investigate the relationship between the impact of promotional activities on consumer engagement in SMEs.

Design of Research

In order to thoroughly examine the phenomena related to promotional activities and their influence on customer engagement in SMEs, the study used an exploratory research approach.

Techniques Option

Quantitative Research: This method collects data from a large number of respondents by using standardised instruments like questionnaires. It makes it possible to find patterns and relationships using statistical analysis.

Techniques for Gathering Data

Primary Data: Survey: To collect information on the effects of promotional initiatives from the viewpoint of clients who have worked with SME businesses, a structured survey will be sent out. Source Information: Journal and Article To offer context and support the primary facts, pertinent literature and articles will be studied.

Method of Research

Research Framework

Exploratory research approach is used in this study to thoroughly examine the phenomena related to promotional activities and how they affect consumer involvement in small and medium-sized enterprises.

Procedures Selection

Quantitative Research: In order to collect data from a large number of respondents, this approach uses structured instruments like questionnaires. Finding patterns and relationships using statistical analysis is made possible.

Strategies for Gathering Data

Survey: An organised survey will be sent out to collect information on the effects of marketing initiatives from the viewpoint of clients who have worked with small and medium-sized enterprises.

Additional Information: Journal & Article The original data will be complemented and further contextualised by reviewing pertinent literature and articles.

3.9 Conclusion

The present chapter delineates the research approach employed to examine the function of technopreneurs in the creation of inventive and astute marketing tactics for heritage apps. The study attempts to offer a thorough grasp of the difficulties and tactics associated with fusing technology and marketing in the heritage industry by utilising a multi-method approach. The research's conclusions will add to the body of knowledge already in existence and provide technopreneurs and managers of cultural sites with useful information. This research will demonstrate how technopreneurship can improve cultural heritage promotion and preservation, opening the door for more advancements in the field.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

CHAPTER 4

DATA ANALYSIS AND DISCUSSION

4.1 Introduction

The next section of this chapter will delve deeper into data analysis and additional research to reveal specific insights. The Google Form survey question is made to be as inclusive and widely accessible as possible, as the report emphasises. Many people can easily participate and offer their opinions because the poll is conducted online and guides respondents through it. SPSS software is used for data analysis in order to analyse and convert statistical data into response information that is understandable and allows for a thorough comprehension of the results.

4.2 Analysis of Pilot Test

The researcher conducted a pilot test of the questionnaire before distributing it to a large number of respondents. This pilot test was conducted to test the reliability of the questionnaire to ensure that the questions could be well received by the respondents and that the questions chosen were clear for the accuracy of data collection in this study. The internal consistency of the questionnaire items was measured using Cronbach's Alpha. 30 respondents participated in this pilot test as shown in the table below.

		Ν	%
Cases	Valid	30	96.8
	Excluded ^a	1	3.2
	Total	31	100.0

Case Processing Summary

a. Listwise deletion based on all variables in the

procedure.

Reliability Statistics			
	Cronbach's		
	Alpha Based on		
Cronbach's	Standardized		
Alpha	Items	N of Items	
.927	.933	14	

Table 4.1: The Reliability Test Results For 30 Respondents [Sources: Data Analysis of SPSS]

Table 4.1 show the statistical measure that assesses internal consistency, Cronbach's Alpha, was used to evaluate the dependability of the data collected. Cronbach's Alpha based on standardised items was somewhat higher at 0.933 than the Cronbach's Alpha value of 0.927 obtained from the analysis. Across the 14 survey items that were examined, these numbers show a high degree of consistency in the replies, indicating great reliability.

4.3 Descriptive Analysis

4.3.1 Profile of The Respondents

The researcher used descriptive analysis on demographic data collected from the distributed questionnaire. It included details of 181 respondents, including questions related to the respondents' understanding of developing innovation of smart marketing. This data was analyzed using descriptive frequency statistics which will be illustrated using tables, graphs and brief summaries of the observed data patterns. The following table shows the demographic information of all respondents who filled out the questionnaire.

Demographic	Details	Frequency	Percentage (%)
Gender	Female	91	50.3
	Male	90	49.7
Age	15-19	25	13.8
	20-29	57	31.5
	30-39	59	32.6
	40 - 49	33	18.2
1.4.1/2	50 and above	7	3.9
NALATS	AMA		
Education	SPM	6	3.3
EX	STPM	16	8.8
	Diploma	60	33.1
152	Degree	99	54.7
Gadget Owned	Smartphone	22	12.7
11/2	Tablet	44	24.3
سبا مارك	Notebook	48	26.5
UNIVERSI	Laptop desktop	16 MALAYSIA ME	LAKA ^{8.8}

Table 4.2: Demographic Information

Table 4.3: Gender of Respondents

[Source: Data Analysis of SPSS]



Figure 4.1: Gender of Respondent [Source: Data Analysis of SPSS]

There are almost equal numbers of male and female survey participants, according to the gender distribution of the responses. Ninety people (49.7%) identified as female, and 91 people (50.3%) identified as male out of the 181 respondents. This equitable distribution guarantees that the information gathered includes a range of viewpoints from both sexes. This kind of representation is essential to attaining a thorough and objective study because it nearly equally represents the experiences and viewpoints of male and female participants. The survey

results' inclusivity and dependability are improved by this balancing.

4.3.1.2 Age

Table 4.4: Age of Respondents

[Source: Data Analysis of SPSS]

Age					
					Cumulative
		Frequency	Percent	Valid Percent	Percent
Valid	15-19	25	13.8	13.8	13.8
	20-29	57	31.5	31.5	45.3
	30-39 LAYS	59	32.6	32.6	77.9
	40-49	33	18.2	18.2	96.1
	50 and above	7	3.9	3.9	100.0
	Total	Č181	100.0	100.0	



Figure 4.2: Age of Respondents [Source: Data Analysis of SPSS]

A wide range of age groups are represented in the respondents' age distribution, with the majority falling within the younger to middle-aged range. Twenty-five (13.8%) of the 181 respondents are between the ages of 15 and 19, making them the youngest group in the study. The greatest segment of respondents, with 57 persons (31.5%), are in the 20–29 age bracket,

closely followed by 59 participants (32.6%) in the 30–39 age range. Additionally, a sizable fraction of the sample—33 respondents, or 18.2%—are between the ages of 40 and 49. Last but not least, a smaller group of 7 participants (3.9%) represents people over 50. This distribution ensures that the survey captures input from a broad spectrum of age groups, offering valuable insights across different generational perspectives.


	Education										
					Cumulative						
		Frequency	Percent	Valid Percent	Percent						
Valid	spm	6	3.3	3.3	3.3						
	stpm	16	8.8	8.8	12.2						
	diploma	60	33.1	33.1	45.3						
	degree	99	54.7	54.7	100.0						
	Total	181	100.0	100.0							



[Source: Data Analysis of SPSS]

The respondents' educational backgrounds demonstrate a range of academic credentials, with the majority possessing degrees from higher education. Six people (3.3%) out of the 181 participants had finished SPM, making them the smallest group in the poll. STPM certifications are held by a slightly larger group of 16 respondents (8.8%). Among the participants, 60 people (33.1%) have a diploma, which is a strong representation of those with intermediate education. The bulk of respondents had advanced degrees, as seen by the largest group of 99 respondents (54.7%) who have earned a degree. This distribution shows that people with different educational backgrounds contributed to the survey, providing a range of viewpoints depending on their educational experiences.

4.3.1.4 Gadget owned

	Gadget owned									
Frequenc Valid Cumulativ										
	y Percent Percent Percent									
Valid	smart phone	50	27.6	27.6	27.6					
	tablet	23	12.7	12.7	40.3					
	notebook	44	24.3	24.3	64.6					
	laptop	48	26.5	26.5	91.2					
	desktop	16	8.8	8.8	100.0					
	Total	181	100.0	100.0						

Table 4.6: Gadget owned



Figure 4.4: Gadget owned [Source: Data Analysis of SPSS]

Smartphones are the most often owned device, yet the data on respondents' gadgets shows a wide range of preferences. Of the 181 respondents, 50 (27.6%) said they owned a smartphone, making it the most common device in the study. Notebooks, owned by 44 participants (24.3%), and laptops, owned by 48 respondents (26.5%), come in second and third, respectively. Desktops are the least frequent device, owned by only 16 respondents (8.8%), whereas tablets are owned by 23 people (12.7%). These results show that respondents own a

majority of mobile and portable devices, which is consistent with current accessibility and technology usage trends.

4.3.2 Research Question Analysis

4.3.2.1 Independent Variable, Item Statistics

	Iten	n Statistics		
	Mean	Std. Deviation	Ν	
IV1	4.20	.400	181	
IV2	4.24	.430	181	
IV3	4.21	.408	181	
IV4	4.26	.440	181	
IV5	4.22	.416	181	
IV6	4.20	.404	181	
IV7	4.22	.416	181	
IV8	4.12	.328	181	
IV9	4.13	.340	181	
		Ta	ble 4.7: Iter	n Statistics

[Source: Data Analysis of SPSS]

Table 4.7 show, the item statistics indicate that the mean scores range from 4.12 to 4.26, with standard deviations varying between 0.328 and 0.440. Each item was evaluated by a total of 181 respondents, providing a substantial sample size for reliable analysis. The highest mean score recorded is 4.26, accompanied by a standard deviation of 0.440, while the lowest mean score is 4.12, with a standard deviation of 0.328. As seen by the low standard deviation numbers, which show little variation in the replies, these results imply that the scores are generally consistent across all items. Additionally, the near uniformity of the mean scores suggests that respondents' judgements of the items were reasonably consistent. This consistency indicates that participants' assessments are highly in accord with one another and emphasises the data's dependability.

Inter-Item Correlation Matrix									
	IV1	IV2	IV3	IV4	IV5	IV6	IV7	IV8	
IV1	1.000	.621	.559	.305	.135	.056	.035	.111	
IV2	.621	1.000	.625	.458	.257	.192	.133	.026	
IV3	.559	.625	1.000	.685	.477	.411	.314	.140	
IV4	.305	.458	.685	1.000	.565	.481	.474	.165	
IV5	.135	.257	.477	.565	1.000	.688	.679	.413	
IV6	.056	.192	.411	.481	.688	1.000	.754	.608	
IV7	.035	.133	.314	.474	.679	.754	1.000	.617	
IV8	.111	.026	.140	.165	.413	.608	.617	1.000	
IV9	.091	.006	002	.066	.027	.165	.224	.403	

4.3.2.2 Independent Variable, Inter Item Correlation Matrix

Table 4.8: Inter-Item Correlation Matrix

[Source: Data Analysis of SPSS]

Table 4.8 show, the links between the variables (IV1 to IV9) in the dataset are revealed by the inter-item correlation matrix. Since all the diagonal values are 1.000, every variable has a perfect correlation with every other variable.

Looking at the off-diagonal values, the correlations range from a strong positive correlation of .754 (between IV6 and IV7) to a weak or negligible correlation of -.002 (between IV3 and IV9). Notably, IV1 shows a moderate correlation with IV2 (.621) and IV3 (.559), while its correlation with other variables, such as IV5 (.135), IV6 (.056), IV7 (.035), and IV8 (.111), is weak. Similarly, IV2 exhibits stronger correlations with IV3 (.625) and IV4 (.458), but weaker associations with IV5 to IV8. The strongest relationships are observed among adjacent variables, particularly IV5, IV6, and IV7, which show consistently high correlations (e.g., IV5 and IV6 at .688, IV6 and IV7 at .754, and IV5 and IV7 at .679). This clustering suggests that these variables might measure related constructs or dimensions. In contrast, IV9 generally displays weak correlations with most variables, such as IV1 (.091), IV2 (.006), and IV3 (-.002), indicating minimal association. However, its correlation with IV8 (.403) is relatively higher, suggesting a moderate relationship with that variable.

All things considered, the matrix illustrates different levels of correlation between the variables, with some displaying more robust correlations and others being comparatively independent. This variability can guide subsequent investigations, such factor analysis or regression modelling, and assist in locating clusters of connected variables.

4.3.2.3 Independent Variable, Item Total Statistics

	Item-Total Statistics									
				С	orrected Item-	Squared		Cronbach's		
		Scale Mean if	Scale Variance		Total	Multiple		Alpha if Item		
	X	Item Deleted	if Item Deleted		Correlation	Correlation		Deleted		
IV1		33.61	4.561		.370	.508		.823		
IV2	F	33.57	4.347		.458	.514		.813		
IV3		33.60	4.096		.659	.665		.788		
IV4		33.55	4.015		.650	.586		.789		
IV5		33.59	4.087		.650	.604		.789		
IV6		33.61	4.106	•	.661	.688		.788		
IV7		33.59	4.121		.627	.679		.792		
IV8		33.69	4.593		.465	.561		.812		
IV9	U	33.68	4.986		.166	.208	A	.840		

Table 4.9: Item-Total Statistics

[Source: Data Analysis of SPSS]

Table 4.9 show, the contribution of each variable (IV1 through IV9) to the overall reliability and consistency of the scale is thoroughly evaluated using the item-total statistics. Each row illustrates how the removal of the corresponding item might affect the overall statistics.

The "Scale Mean if Item Deleted" numbers, which range from 33.55 (when IV4 is deleted) to 33.69 (when IV8 is eliminated), show the average score of the scale when a particular item is removed. This implies that the relative contributions of each item to the overall mean are comparable.

"Scale Variance if Item Deleted" values range from 4.015 (IV4) to 4.986 (IV9). Items that have lower variance values are thought to contribute to the scale's increased consistency. Upon deletion, IV9 exhibits the largest variance, suggesting that it makes the least contribution to the scale's overall consistency.

The degree of correlation between each item and the overall scale is indicated by the "Corrected Item-Total Correlation". With correlation values ranging from.166 (IV9) to.661 (IV6), the majority of items exhibit moderate to strong relationships. The corrected item-total correlation for IV9 is the lowest, indicating that it is less in line with the scale's overall construct.

How effectively each item on the scale is predicted by the other items is indicated by the "Squared Multiple Correlation" scores. IV9 is the least predicted by the other factors, whereas IV6 is the most predictable, according to these numbers, which range from.208 (IV9) to.688 (IV6).

The impact of eliminating each item on the overall reliability of the scale is displayed in the "Cronbach's Alpha if Item Deleted" column. Removing IV9 results in the greatest overall Cronbach's Alpha (0.840), indicating that this might enhance the internal consistency of the scale. On the other hand, removing items such as IV3, IV4, and IV6 results in a somewhat lower Cronbach's Alpha, suggesting that these factors are essential to the dependability of the scale.

With IV9 being the least aligned and possibly the poorest contributor to the overall construct, these results indicate that most of the items contribute favourably to the consistency and reliability of the scale.

4.3.3 DV variables, Item Statistics

Mean	Std. Deviation	Ν
4.14	.346	181
4.20	.404	181
4.14	.346	181
4.24	.427	181
4.18	.387	181

Item Statistics

Table 4.10: Item Statistics

[Source: Data Analysis of SPSS]

The descriptive information for five questions that were assessed by 181 respondents is highlighted in the item statistics. There is a usually high degree of agreement or positive response across the items, as indicated by the mean scores, which vary from 4.14 to 4.24. Two things have the lowest mean (4.14), while the item with the highest mean (4.24) indicates somewhat stronger agreement.

The standard deviations show different levels of response consistency, ranging from 0.346 to 0.427. While the item with a standard deviation of 0.427 indicates somewhat more variety in responses, the items with a standard deviation of 0.346 show the maximum consistency among respondents.

Overall, the data suggest that the respondents' ratings are relatively consistent, with only slight variations in agreement levels across the items. This consistency strengthens the reliability of the collected responses.

4.3.3.1 DV variables, Inter-Item Correlation Matrix

Inter-Item Correlation Matrix										
	DV1	DV2	DV3	DV4	DV5					
DV1	1.000	.710	.861	.567	.433					
DV2	.710	1.000	.710	.490	.364					
DV3	.861	.710	1.000	.642	.557					
DV4	.567	.490	.642	1.000	.510					
DV5	.433	.364	.557	.510	1.000					

Inter-Item Correlation Matri

Table 4.10: Inter-Item Correlation Matrix

[Source: Data Analysis of SPSS]

The correlations between the five dependent variables (DV1 through DV5) are depicted in the inter-item correlation matrix. Every diagonal value is 1.000, indicating that every variable has a perfect correlation with every other variable.

The degree to which two variables are correlated is shown by the off-diagonal values. DV1 and DV3 had the largest correlation (r = .861), indicating a very significant association. The correlations vary from moderate to high. Similarly, DV2 exhibits a strong correlation with both DV1 (r = .710) and DV3 (r = .710), suggesting that these variables are closely related.

A noteworthy but weaker association is shown by the moderate correlations found between DV4 and other variables, including DV3 (r = .642) and DV5 (r = .510). With values ranging from .364 (DV2) to .557 (DV3), the correlations between DV5 and the other variables are the weakest, suggesting less relationship.

According to the matrix, DV4 and DV5 are only weakly related to the other three, although DV1, DV2, and DV3 appear to be more tightly related overall. These connections can help guide additional analysis, including finding related variable clusters or comprehending the dataset's underlying structure.

4.3.3.2 DV variables, Item-Total Statistics

	Item-1 otal Statistics										
			Corrected Item-	Squared	Cronbach's						
	Scale Mean if	Scale Variance	Total	Multiple	Alpha if Item						
	Item Deleted	if Item Deleted	Correlation	Correlation	Deleted						
DV1	16.76	1.604	.785	.764	.822						
DV2	16.70	1.568	.672	.544	.847						
DV3	16.76	1.549	.864	.810	.804						
DV4	16.66	1.536	.656	.450	.853						
DV5	16.72	1.715	.540	.361	.878						

T (**) (** ()

Table 4.11: Inter-Item Correlation Matrix

[Source: Data Analysis of SPSS]

The item-total statistics offer comprehensive information about how each dependent variable (DV1-DV5) affects the consistency and dependability of the entire scale. Each row illustrates how the removal of a particular item might affect the scale data as a whole.

The average score of the scale when a particular item is removed is shown by the "Scale Mean if Item Deleted" values. These numbers indicate that each item contributes similarly to the overall mean, ranging from 16.66 (when DV4 is deleted) to 16.76 (when DV1 or DV3 is deleted).

The range of values for "Scale Variance if Item Deleted" is 1.536 (DV4) to 1.715 (DV5). While the higher variation for DV5 (1.715) shows it contributes less to the overall consistency, lower variance values, such as those for DV4 (1.536) and DV3 (1.549), imply that these items contribute more to the scale's overall consistency.

For each item, the "Corrected Item-Total Correlation" calculates the correlation with the overall scale. The results show that DV3 is the most tightly linked with the overall construct, while DV5 has the worst alignment, with values ranging from.540 (DV5) to.864 (DV3).

How effectively each item on the scale is predicted by the other items is indicated by the "Squared Multiple Correlation" scores. The assumption that DV3 is more tightly integrated within the scale and DV5 is less predictive of or predicted by the other items is further supported by these numbers, which vary from.361 (DV5) to.810 (DV3).

The reliability of the scale in the event that a particular item were eliminated is indicated by the "Cronbach's Alpha if Item Deleted" values. When DV1 (.822), DV2 (.847), DV3 (.804), or DV4 (.853) are removed, the total Cronbach's Alpha falls, indicating that these items have a substantial impact on the dependability of the scale. When DV5 is eliminated, the Cronbach's Alpha rises to.878; this indicates that DV5 contributes the least to the internal consistency of the scale.

With DV3 contributing the most and DV5 the least, the research shows that most items are highly linked with the scale overall. While the other components are necessary to preserve the scale's consistency, DV5 removal may increase the scale's reliability.

4.4 Reliability Analysis

The researcher performed Cronbach's Alpha analysis to test the reliability of the set of items used in the study. The researcher used SPSS version 27 for the testing of this Cronbach Alpha value. A good reliability of variables is shown through 0.7 and above, while 0.6 value and below has a lack of correlation or poor reliability. Hence, the Cronbach's Alpha value of this study is presented in the table below.

	Case Processing Summary						
		Ν	%				
Cases	Valid	181	100.0				
	Excluded ^a	0	.0				
	Total	181	100.0				

a. Listwise deletion based on all variables in the procedure.

Table 4.12: Case Processing Summary [Source: Data Analysis of SPSS]

Reliability Statistics					
	Cronbach's				
	Alpha Based on				
Cronbach's	Standardized				
Alpha	Items	N of Item			
.869	.875				

Table 4.12: Reliability Statistics [Source: Data Analysis of SPSS]

Cronbach's Alpha was used in the reliability study of the data to evaluate the items' internal consistency. Based on standardised items, the results show a somewhat higher Cronbach's Alpha value of 0.875, although the overall score is 0.869. These results show strong reliability across the five items that were examined, indicating that the items are reliable and accurately assess the intended construct. The data's trustworthiness and resilience for additional analysis are improved by this high degree of reliability.



4.5 Pearson Correlation Analysis

	Correlations									
		IV1	IV2	IV3	1∨4	IV5	DV			
IV1	Pearson Correlation	1	.597**	.081	.099	.138	.936**			
	Sig. (2-tailed)		<.001	.276	.186	.065	<.001			
	Ν	181	181	181	181	181	181			
IV2	Pearson Correlation	.597**	1	.379**	.039	.126	.814**			
	Sig. (2-tailed)	<.001		<.001	.605	.090	<.001			
	Ν	181	181	181	181	181	181			
IV3	Pearson Correlation	.081	.379**	1	.482**	.093	.144			
	Sig. (2-tailed)	.276	<.001		<.001	.212	.053			
	Ν	181	181	181	181	181	181			
I∨4	Pearson Correlation	.099	.039	.482**	1	.450**	.067			
	Sig. (2-tailed)	.186	.605	<.001		<.001	.373			
	Ν	181	181	181	181	181	181			
IV5	Pearson Correlation	.138	.126	.093	.450**	1	.138			
	Sig. (2-tailed)	.065	.090	.212	<.001		.064			
	N MALATOA	181	181	181	181	181	181			
DV	Pearson Correlation	.936**	.814**	.144	.067	.138	1			
	Sig. (2-tailed)	<.001	<.001	.053	.373	.064				
	NS	181	181	181	181	181	181			

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.13: Reliability Statistics [Source: Data Analysis of SPSS]

The correlation table provides an in-depth statistical analysis of the relationships between five independent variables (IV1, IV2, IV3, IV4, IV5) and a dependent variable (DV) using Pearson correlation coefficients. The table presents correlation values, significance levels (p-values), and the sample size (N = 181 for all variables), offering insight into how these variables interact with each other and their potential impact on the dependent variable.

Correlation Between Independent Variables (IVs) and Dependent Variable (DV)

From the table, it is evident that IV1 has the strongest positive correlation with the dependent variable (DV), with a Pearson correlation coefficient of 0.936 and a significance level of p < 0.001. This suggests that IV1 plays a critical role in influencing DV, with a near-perfect linear relationship. A high correlation coefficient close to 1 implies that an increase in IV1 is strongly associated with an increase in DV. The fact that the significance level is below 0.001 further strengthens the reliability of this correlation, indicating that the observed relationship is not due to random chance.

Similarly, IV2 also exhibits a strong and statistically significant positive correlation with DV ($\mathbf{r} = 0.814$, $\mathbf{p} < 0.001$). While slightly lower than IV1's correlation with DV, the strong association suggests that IV2 is another key predictor of DV. The positive nature of this correlation implies that an increase in IV2 is likely to result in an increase in DV. The significance level of p < 0.001 indicates that this relationship is highly reliable.

On the other hand, **IV3 has a much weaker correlation with DV (r = 0.144, p = 0.053)**. Although the correlation is positive, the significance level is slightly above 0.05, meaning that this correlation is not statistically significant at the 0.01 level. This suggests that IV3 may not have a strong or consistent impact on DV. While there may be a small association, it is not strong enough to be considered a crucial predictor.

IV4, with a Pearson correlation coefficient of 0.067 (p = 0.373), shows a very weak correlation with DV, which is not statistically significant. This indicates that IV4 has little to no meaningful impact on DV, as the correlation is close to zero. The p-value further suggests that any observed relationship is likely due to chance rather than a genuine association.

Similarly, **IV5 also has a weak correlation with DV (r = 0.138, p = 0.064)**. While the correlation is slightly stronger than IV4's, it is still not statistically significant at the 0.01 level. This suggests that IV5 does not play a major role in predicting DV, though there might be some minor influence.

Correlation Among Independent Variables (IVs)

The correlation among independent variables is also analyzed to determine how they relate to each other. IV1 and IV2 show a strong positive correlation (r = 0.597, p < 0.001), indicating a significant relationship between these two independent variables. This suggests that IV1 and IV2 tend to increase or decrease together. The significance level (p < 0.001) confirms that this correlation is highly reliable and not due to chance.

In contrast, IV1 and IV3 have a weak correlation (r = 0.081, p = 0.276), which is not statistically significant. This suggests that IV1 and IV3 do not have a meaningful relationship. Similarly, IV1 and IV4 (r = 0.099, p = 0.186) and IV1 and IV5 (r = 0.138, p =0.065) also exhibit weak and insignificant correlations. This means that changes in IV1 are not strongly associated with changes in IV3, IV4, or IV5.

IV2 and IV3, however, show a moderate positive correlation (r = 0.379, p < 0.001), which is statistically significant. This suggests that these two variables have some level of association. While the correlation is not as strong as that between IV1 and IV2, it is still meaningful. IV2 and IV4, on the other hand, have a very weak correlation (r = 0.039, p = 0.605), which is not statistically significant, suggesting little to no relationship.

Additionally, IV2 and IV5 have a weak correlation (r = 0.126, p = 0.090), which is also not statistically significant. This suggests that IV2 and IV5 do not strongly influence each other. IV3 and IV4, however, show a moderate positive correlation (r = 0.482, p < 0.001), which is statistically significant. This suggests that there is a meaningful relationship between IV3 and IV4, indicating that they may influence each other.

IV3 and IV5 have a weak correlation (r = 0.093, p = 0.212), which is not statistically significant, indicating little association. In contrast, IV4 and IV5 show a moderate positive correlation (r = 0.450, p < 0.001), which is statistically significant. This means that these two variables tend to increase or decrease together, and the relationship is meaningful.

Key Takeaways and Interpretations

- 1. **IV1 and IV2 are the strongest predictors of DV**, with strong positive correlations that are statistically significant at p < 0.001. This suggests that these variables are the most influential in determining the outcome of the dependent variable.
- 2. **IV3, IV4, and IV5 have weaker correlations with DV**, and their relationships are not statistically significant at the 0.01 level. This suggests that these variables may not be strong predictors of DV.
- 3. There are significant correlations among some independent variables, particularly IV1 and IV2, IV2 and IV3, IV3 and IV4, and IV4 and IV5. These correlations suggest that certain independent variables may be related to each other.
- 4. Some independent variables show no significant correlation with each other, such as IV1 with IV3, IV1 with IV4, IV1 with IV5, and IV2 with IV4. This suggests that these variables operate independently.
- 5. The significance levels indicate the reliability of the correlations, with only those at p < 0.001 considered highly reliable. Other correlations, while present, may not be strong enough to draw definitive conclusions.

In conclusion, the correlation analysis highlights the key relationships among the independent variables and their impact on the dependent variable. IV1 and IV2 are the most influential predictors, while IV3, IV4, and IV5 have weaker associations. Understanding these correlations can help in making informed decisions and improving predictive models related to the dependent variable.

4.6 Multiple Regression Analysis



Table 4.14: Model Summary

[Source: Data Analysis of SPSS]

The model summary table presents the statistical results of a regression analysis, highlighting the relationship between the dependent variable and the independent variables (IV5, IV3, IV1, IV4, IV2).

The multiple correlation coefficient (R) is **0.992**, indicating a very strong positive relationship between the independent variables and the dependent variable. The **R Square (0.984)** shows that 98.4% of the variance in the dependent variable is explained by the independent variables, which suggests a highly predictive model. The **Adjusted R Square (0.983)** accounts for the number of predictors in the model, ensuring that the explained variance is not inflated due to the inclusion of multiple variables.

The standard error of the estimate (0.04041) indicates the average deviation of observed values from the predicted values, suggesting a very precise model. The **R Square Change** (0.984) confirms that the inclusion of these predictors significantly improves the model's explanatory power.

The F Change value (2091.830) with degrees of freedom (df1 = 5, df2 = 175) and a significance value (p < 0.001) confirms that the regression model is statistically significant. This means that the combination of IV5, IV3, IV1, IV4, and IV2 significantly predicts the dependent variable, and the likelihood of this result occurring due to chance is extremely low. Overall, the results indicate that the selected independent variables strongly contribute to explaining the dependent variable, making the regression model highly reliable and predictive.

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.083	5	3.417	2091.830	<.001 ^b
	Residual	.286	175	.002		
	Total	17.368	180			

a. Dependent Variable: DV

b. Predictors: (Constant), IV5, IV3, IV1, IV4, IV2

Table 4.15: ANOVA

[Source: Data Analysis of SPSS]

The ANOVA table presents the results of an analysis of variance, which assesses the overall significance of the regression model in predicting the dependent variable (DV) based on the independent variables (IV5, IV3, IV1, IV4, IV2).

The **regression sum of squares (17.083)** represents the variation in DV that is explained by the model, while the **residual sum of squares (0.286)** represents the unexplained variation. The **total sum of squares (17.368)** is the combined variance in the dependent variable, showing that the majority of the variance is explained by the predictors.

The **degrees of freedom (df) for regression is 5**, corresponding to the number of predictors, while the **df for residual is 175**, representing the remaining variance in the dataset. The mean square values are obtained by dividing the sum of squares by their respective degrees of freedom, resulting in a **mean square for regression of 3.417** and a **mean square for residual of 0.002**.

The **F-statistic (2091.830)** is a measure of how well the independent variables predict the dependent variable. A high F-value suggests that the model significantly improves prediction over a model with no predictors. The associated **p-value (< 0.001)** indicates that the model is highly significant, meaning that there is an extremely low probability that the observed relationship occurred by chance.

Overall, the ANOVA results confirm that the regression model is statistically significant, and the independent variables collectively contribute to predicting the dependent variable in a meaningful way.

				Standardize				
		Unstan	dardized	d				
		Coel	fficients	Coefficients				
Mode		В	Std. Error	Beta	t	Sig.		
1	(Constant)	.094	.062		1.504	.134		
	IV1	.627	.012	.675	53.353	<.001		
	IV2	.425	.013	.449	31.966	<.001		
	IV3	084	.011	098	-7.533	<.001		
	IV4	.033	.011	.039	2.929	.004		
	IV5	022	.012	020	-1.773	.078		

Table 4.16: Coefficients

[Source: Data Analysis of SPSS]

The table presents the results of a multiple regression analysis, which examines the relationship between five independent variables (IV1 to IV5) and a dependent variable. The table includes both unstandardized and standardized coefficients, along with their standard errors, t-values, and significance levels. The unstandardized coefficients (B) represent the raw effect of each independent variable on the dependent variable, while the standardized coefficients (Beta) indicate the relative importance of each predictor in the model.

The constant (intercept) has a coefficient of 0.094, but its significance level (p = 0.134) suggests that it is not statistically significant, meaning it does not contribute meaningfully to predicting the dependent variable. Among the independent variables, IV1 has the highest standardized coefficient ($\beta = 0.675$), indicating that it has the strongest positive effect on the dependent variable. Moreover, its p-value is less than 0.001, confirming that this effect is statistically significant. Similarly, IV2 also has a strong positive influence, with a standardized coefficient of 0.449 and a highly significant p-value (< 0.001). These results suggest that both IV1 and IV2 are key predictors in the model.

On the other hand, IV3 exhibits a negative relationship with the dependent variable, as indicated by its negative standardized coefficient ($\beta = -0.098$). The t-value of -7.533 and the highly significant p-value (< 0.001) suggest that this negative effect is statistically meaningful. In contrast, IV4 has a small positive effect, with a standardized coefficient of 0.039, and its p-value of 0.004 indicates statistical significance. However, IV5 does not appear to have a significant impact, as its p-value (0.078) is above the commonly used significance threshold of 0.05. This suggests that IV5 does not contribute significantly to the model.

Overall, the regression analysis highlights that IV1 and IV2 are the most influential predictors, exerting strong positive effects on the dependent variable. IV3, although significant, has a negative impact, while IV4 has a minor positive effect. Meanwhile, IV5 does not show statistical significance, indicating that it may not be an important factor in predicting the dependent variable.

4.7 Hypothesis Testing

IV1 and the Dependent Variable

- Null Hypothesis (H₀): IV1 has no significant effect on the dependent variable (B = 0, p > 0.05).
- Alternative Hypothesis (H₁): IV1 has a significant positive effect on the dependent variable (B ≠ 0, p < 0.05).

IV2 and the Dependent Variable

- Null Hypothesis (H₀): IV2 has no significant effect on the dependent variable (B = 0, p > 0.05).
- Alternative Hypothesis (H₁): IV2 has a significant positive effect on the dependent variable (B ≠ 0, p < 0.05).

IV3 and the Dependent Variable

- Null Hypothesis (H₀): IV3 has no significant effect on the dependent variable (B = 0, p > 0.05).
- Alternative Hypothesis (H₁): IV3 has a significant negative effect on the dependent variable (B < 0, p < 0.05).

IV4 and the Dependent Variable

- Null Hypothesis (H₀): IV4 has no significant effect on the dependent variable (B = 0, p > 0.05).
- Alternative Hypothesis (H₁): IV4 has a significant positive effect on the dependent variable (B ≠ 0, p < 0.05).

IV5 and the Dependent Variable

- Null Hypothesis (H₀): IV5 has no significant effect on the dependent variable (B = 0, p > 0.05).
- Alternative Hypothesis (H₁): IV5 has a significant effect on the dependent variable (B ≠ 0, p < 0.05).

Interpretation of the Hypothesis Testing Results

The results of the regression analysis provide insight into the significance of each independent variable in influencing the dependent variable:

- IV1 (p < 0.001) has a strong positive effect, leading to the rejection of the null hypothesis and acceptance of the alternative hypothesis. This suggests that IV1 plays a crucial role in impacting the dependent variable.
- IV2 (p < 0.001) also exhibits a significant positive effect, supporting the rejection of the null hypothesis. This indicates that IV2 is another key predictor in the model.
- IV3 (p < 0.001) shows a significant negative effect, leading to the rejection of the null hypothesis and acceptance of the alternative hypothesis. This suggests that IV3 negatively influences the dependent variable.
- IV4 (p = 0.004) has a minor but statistically significant positive effect, resulting in the rejection of the null hypothesis in favor of the alternative. Although its effect is small, it contributes positively to the model.
- **IV5 (p = 0.078)** is not statistically significant, meaning the null hypothesis cannot be rejected. This implies that IV5 does not have a meaningful impact on the dependent variable.

Interpretation of Results:

IV1 (p < 0.001) and IV2 (p < 0.001) have strong positive effects \rightarrow Reject H₀, accept that they significantly impact the dependent variable.

IV3 (p < 0.001) has a significant negative effect \rightarrow Reject H₀, accept that it negatively affects the dependent variable.

IV4 (p = 0.004) has a minor but significant positive effect \rightarrow Reject H₀, accept that it contributes positively.

IV5 (p = 0.078) is not significant \rightarrow Fail to reject H₀, meaning it does not have a meaningful effect.

4.8 Summary

To conclude, the researcher going over the findings in this chapter. SPSS version 27 was used to calculate the reliability analysis, descriptive analysis, Pearson correlation analysis and multiple linear regression analysis. Through the analysis, the researcher determined how the three independent factors and the dependent variable were related. The hypothesis testing resulted to the acceptance of one hypothesis and rejection of the remaining two hypothesis. The researcher will go over the findings and recommendations in the upcoming chapter.

CHAPTER 5

CONCLUSION AND RECOMMENTIONS

5.1 Introduction

This chapter consists of thorough synopsis if the overall study, which includes methodology and main findings. The outcomes from the previous chapter are explained in detail in this chapter to fulfil all of the stated goals. This chapter will discuss explores the reasoning for accepting or rejecting theories. In addition, the researcher also provides additional suggestions for future researchers working in the same area.

Summary of Desc	riptive Analysis						
Demographic	Details	Frequency	Percentage (%)				
Gender	Female	91	50.3				
Gender	Male	90	49.7				
	15-19	25	13.8				
4*	20-29	57	31.5				
	30-39	1K A 1 ⁵⁹ A A	AV 32.6 ME				
Age	40 - 49	33	18.2				
	50 and above	7	3.9				
	SPM	6	3.3				
F1	STPM	16	8.8				
Education	Diploma	60	33.1				
	Degree	99	54.7				
	Smartphone	22	12.7				
Gadget Owned	Tablet	44	24.3				
	Notebook	48	26.5				
	Lantan	16	8.8				

Table 5.1: Summary of Descriptive Analysis of Respondents Demographic[Source: Data Analysis of SPSS]

A number of 181 respondents has been involved for data collection in this study. According to Table 5.1, the majority of participants are female and the highest age range of the respondents is 18–25 years old. Most of the participants belonged to had a bachelor's degree level of education. A lot of them have tablet for teir gadget owned than smart phone , notebook, and laptop.

5.3 Summary of study

This study examines the role of technopreneurs in driving innovation within smart marketing. The regression analysis highlights the impact of various factors on the success of innovative marketing strategies. The findings indicate that key independent variables, such as technological adoption (IV1) and digital transformation strategies (IV2), have strong and significant positive effects on the development of smart marketing innovations. These results suggest that technopreneurs who leverage advanced technology and digital tools play a crucial role in enhancing marketing effectiveness and customer engagement.

However, challenges such as resistance to change (IV3) negatively impact the adoption of smart marketing innovations, while organizational support (IV4) plays a smaller but significant role in facilitating these innovations. Interestingly, financial investment in technology (IV5) does not show a statistically significant effect, suggesting that financial resources alone are not enough to drive innovation without proper strategic implementation.

Overall, the study confirms that technopreneurs are essential in fostering smart marketing innovation through technology-driven strategies and digital transformation. Their ability to overcome barriers, adapt to new trends, and implement creative solutions significantly influences the success of modern marketing initiatives.

5.4 Objectives and Hypothesis Testing Discussions

The researcher will discuss each hypothesis tested in this section to examine the relationship between independent variables and dependent variable. This is done to fulfil the research study objectives. The result was analysed to investigate if the research objectives managed to be achieved. 5.4.1 Objective 1: To determine relationship between role of technopreneurs and developing innovation of smart marketing

RO1 aims to determine the relationship between the role of technopreneurs and the development of innovation in smart marketing. This means that the study will investigate how technopreneurs contribute to driving innovation in marketing by leveraging advanced technology and digital tools. It will explore how their ability to adopt and implement emerging technologies, such as artificial intelligence (AI), big data analytics, and digital marketing strategies, enhances marketing efficiency and effectiveness.

Furthermore, the study will assess whether there is a significant relationship between the involvement of technopreneurs and the level of innovation in smart marketing. It will examine the extent to which technopreneurs influence the transformation of traditional marketing approaches into more data-driven and technology-oriented strategies. Their ability to identify market trends, utilize smart tools, and develop creative solutions will be key factors in understanding their contribution to marketing innovation.

Additionally, the research will analyze how the strategic decisions made by technopreneurs impact the adoption of smart marketing innovations. By evaluating their role in fostering a digital marketing ecosystem, the study aims to highlight the importance of technopreneurs in shaping modern marketing landscapes. Ultimately, RO1 seeks to establish whether technopreneurs act as catalysts for marketing innovation and how their involvement leads to the continuous evolution of smart marketing techniques.

5.4.2 Objective 2: To observe the role of technopreneurs in innovation of smart marketing.

Technopreneurs play a vital role in the innovation of smart marketing by leveraging cuttingedge technologies to transform how businesses connect with their customers. They develop advanced marketing tools such as AI-powered analytics, customer relationship management (CRM) systems, and automation platforms that help businesses personalize their marketing strategies and optimize customer engagement. By utilizing big data, technopreneurs enable companies to analyze consumer behavior in real-time, allowing for targeted and efficient marketing campaigns. Furthermore, they drive the adoption of artificial intelligence (AI) and machine learning (ML) to predict consumer actions, automate content creation, and refine digital advertising strategies. The integration of the Internet of Things (IoT) also allows for hyper-targeted marketing through connected devices, offering businesses opportunities to create personalized customer experiences. Technopreneurs are also behind the development of new business models, such as subscription services and e-commerce platforms, which complement innovative marketing strategies. Through these technological advancements, technopreneurs enable businesses to reach their target audiences more effectively, driving the evolution of smart marketing.

5.4.3 Objective 3: To investigate the most important role of technopreneurs who can develop innovation in smart marketing.

Objective 3 focuses on investigating the most important role of technopreneurs in developing innovation in smart marketing. Technopreneurs are critical in driving the evolution of smart marketing by combining their technical expertise with entrepreneurial vision to create groundbreaking solutions. One of their most important roles is identifying and implementing emerging technologies such as artificial intelligence, machine learning, big data analytics, and the Internet of Things (IoT) to enhance marketing strategies. By leveraging these technologies, technopreneurs enable businesses to gather and analyze large volumes of customer data, which in turn helps create highly personalized marketing experiences. Another crucial role is pioneering new business models that integrate technology seamlessly into marketing efforts. This could involve creating innovative platforms or tools that empower businesses to better connect with their customers through automation, predictive analytics, and targeted advertising. Furthermore, technopreneurs excel in promoting a data-driven approach, where decisions are based on real-time insights, allowing companies to adjust their strategies swiftly to meet evolving consumer demands. By introducing innovative solutions that make marketing more efficient, effective, and personalized, technopreneurs are at the forefront of revolutionizing smart marketing practices across industries.

Summary of Hypothesis Testing

The hypothesis testing results provide valuable insights into the relationship between the independent variables (IVs) and the dependent variable.

- IV1 has a strong and statistically significant positive effect on the dependent variable (p < 0.001). This indicates that IV1 plays a crucial role in influencing the dependent variable, making it one of the key predictors in the model.
- IV2 also shows a significant positive effect (p < 0.001), confirming that it has a meaningful impact on the dependent variable. Like IV1, IV2 serves as an essential factor in explaining variations in the dependent variable.
- IV3 has a significant negative effect (p < 0.001), suggesting an inverse relationship with the dependent variable. This means that as IV3 increases, the dependent variable decreases, highlighting a contrasting influence compared to IV1 and IV2.
- IV4 demonstrates a minor but statistically significant positive effect (p = 0.004). Although its impact is not as strong as IV1 and IV2, it still contributes positively to the model and cannot be ignored.
- IV5 does not show statistical significance (p = 0.078), meaning its effect on the dependent variable is not strong enough to reject the null hypothesis. This suggests that IV5 does not play a meaningful role in influencing the dependent variable within this study.

Overall, the findings highlight that IV1 and IV2 are the most influential positive predictors, IV3 negatively impacts the dependent variable, IV4 contributes slightly, and IV5 does not have a significant effect. These insights can help guide further research and strategic decision-making based on statistical evidence.

Interpretation of Hypothesis Testing Results

The regression analysis results reveal the extent to which each independent variable influences the dependent variable. The findings are as follows:

- IV1 (p < 0.001) demonstrates a strong and statistically significant positive effect on the dependent variable. Since the p-value is below 0.05, the null hypothesis is rejected, and the alternative hypothesis is accepted. This suggests that IV1 plays a crucial role in shaping the dependent variable, making it one of the key predictors in the model.
- IV2 (p < 0.001) also exhibits a highly significant positive effect on the dependent variable. The null hypothesis is rejected in favor of the alternative hypothesis, confirming that IV2 has a meaningful and positive contribution to the model.
- **IV3** (p < 0.001) has a significant negative impact on the dependent variable. Given the p-value is below 0.05, the null hypothesis is rejected, and the alternative hypothesis is accepted. This indicates that IV3 negatively influences the dependent variable, implying a potential inverse relationship.
- **IV4** (p = 0.004) shows a statistically significant but relatively minor positive effect on the dependent variable. Since the p-value is less than 0.05, the null hypothesis is rejected. Although the effect size is smaller compared to IV1 and IV2, IV4 still contributes positively to the model, albeit to a lesser extent.
- **IV5** (p = 0.078) does not exhibit a statistically significant effect on the dependent variable, as its p-value exceeds the 0.05 threshold. Consequently, the null hypothesis cannot be rejected, indicating that IV5 does not have a meaningful impact on the dependent variable within this model.

Conclusion

The hypothesis testing results provide valuable insights into the role of each independent variable in influencing the dependent variable. IV1 and IV2 emerge as the strongest positive predictors, while IV3 has a significant negative impact. IV4 contributes positively but with a lesser magnitude, whereas IV5 does not demonstrate a significant influence. These findings help in understanding the key drivers affecting the dependent variable and can guide future strategic decisions based on the statistical evidence presented.

5.5 Implication of Study

This study highlights the critical role of technopreneurs in fostering innovation within smart marketing. Their contributions lead to significant advancements in business strategies, customer engagement, and overall market competitiveness.

Technopreneurs drive innovation by leveraging emerging technologies such as artificial intelligence (AI), big data analytics, and automation. Through these technologies, businesses can develop data-driven marketing campaigns, optimize advertising strategies, and enhance customer targeting, ultimately gaining a competitive advantage in the digital economy. Their ability to integrate technology into marketing processes accelerates digital transformation, enabling businesses to transition from traditional to more efficient, tech-driven approaches. The study also emphasizes the importance of customer experience in smart marketing. By introducing innovations such as chatbots, predictive analytics, and interactive marketing tools, technopreneurs help businesses deliver personalized and real-time interactions with consumers. These innovations not only improve customer satisfaction but also foster long-term brand loyalty.

From a policy perspective, governments and regulatory bodies can play a significant role in supporting technopreneurs through funding, tax incentives, and policies that encourage technological innovation. Creating a supportive ecosystem for digital entrepreneurship can accelerate smart marketing adoption and contribute to economic growth.

Additionally, this study provides a foundation for future research on the evolving role of technopreneurs in marketing innovation. Further exploration into emerging trends such as blockchain, AI-driven content creation, and augmented reality (AR) applications in marketing can offer deeper insights into the future of the industry.

Overall, the study underscores the transformative impact of technopreneurs on smart marketing. By fostering a culture of innovation and embracing digital advancements, businesses can enhance their marketing effectiveness, improve consumer experiences, and stay ahead in an increasingly competitive digital landscape.

5.6 Limitations of Study

While this study provides valuable insights into the role of technopreneurs in developing innovation in smart marketing, several limitations should be acknowledged.

One of the main limitations is the scope of the study, which may be restricted to a specific industry, geographical region, or business size. The findings might not be fully generalizable to all sectors, especially those with different levels of technological adoption and market dynamics. Future research could expand the study to include a broader range of industries and regions to provide a more comprehensive perspective.

Another limitation is the reliance on available data and self-reported information from technopreneurs and businesses. There is a possibility of bias in responses, as participants may overestimate the effectiveness of their innovations or underreport challenges. Conducting longitudinal studies or incorporating more objective performance metrics could enhance the accuracy and reliability of findings.

The rapid evolution of technology poses another challenge, as smart marketing innovations are constantly changing. What is considered cutting-edge today may become obsolete in the near future. This makes it difficult to establish long-term conclusions about the impact of technopreneurs on smart marketing. Future studies should consider continuous updates and real-time analysis of emerging technologies.

Additionally, external factors such as government regulations, economic conditions, and consumer behavior shifts can influence the success of smart marketing innovations. These variables may not be fully accounted for in the study, which could affect the interpretation of results. Further research could explore how these external factors interact with technopreneurial efforts to shape smart marketing trends.

Despite these limitations, the study provides a strong foundation for understanding the contributions of technopreneurs to smart marketing innovation. Addressing these constraints in future research could help refine the findings and provide deeper insights into the evolving landscape of digital marketing and technological entrepreneurship.

5.7 Recommendations for Future Research

Building on the findings of this study, several areas for future research can further explore the role of technopreneurs in developing innovation in smart marketing.

One key area for future research is to expand the scope of the study by including a wider range of industries, business sizes, and geographical regions. This would help to determine whether the role of technopreneurs in driving innovation in smart marketing varies across different contexts. By examining diverse sectors, such as healthcare, finance, or retail, future research could provide a more comprehensive understanding of how technopreneurs contribute to technological advancements and marketing practices in various industries.

Another important avenue for research is the exploration of the specific challenges technopreneurs face in implementing smart marketing innovations. While this study identifies the positive impacts of innovation, it is crucial to examine the barriers, such as lack of resources, regulatory hurdles, or resistance to change, that may hinder the adoption of new technologies. Understanding these obstacles would provide valuable insights into how businesses can better support technopreneurs in overcoming challenges and successfully integrating new technologies into marketing strategies.

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Furthermore, future research could explore the long-term impact of smart marketing innovations introduced by technopreneurs. Given that technology evolves rapidly, it would be valuable to study the sustainability and effectiveness of these innovations over time. Longitudinal studies could track the success of marketing innovations and examine how technopreneurs adapt to changing technologies and market conditions. This research could help businesses stay ahead of trends and ensure that their marketing strategies remain relevant.

Another promising direction for future research is to investigate the influence of external factors, such as government regulations, economic fluctuations, and shifting consumer behaviors, on the success of smart marketing innovations. These external factors can significantly impact how technopreneurs operate and how their innovations are received in the market. By studying these influences, researchers could offer recommendations on how technopreneurs can better navigate these external challenges and thrive in an ever-changing environment.

Lastly, as new technologies emerge, such as blockchain, artificial intelligence (AI), virtual reality (VR), and augmented reality (AR), future studies should investigate their potential applications in smart marketing. Researchers could explore how these technologies could be used by technopreneurs to further enhance customer experiences, streamline marketing processes, and create more personalized marketing strategies. By staying abreast of emerging trends, researchers can help guide technopreneurs in adopting cutting-edge technologies and staying competitive in the market.

In conclusion, future research should aim to expand the scope, examine challenges, explore long-term impacts, and investigate the role of external factors in the development of smart marketing innovations. These areas of inquiry will contribute to a deeper understanding of how technopreneurs drive change and how businesses can capitalize on technological advancements in marketing.

5.8 Conclusion

This study has explored the significant role of technopreneurs in driving innovation within the field of smart marketing. It has demonstrated that technopreneurs are pivotal in integrating emerging technologies, such as artificial intelligence, big data, and automation, into marketing strategies, thereby enhancing customer engagement, optimizing business performance, and providing a competitive advantage.

Through their entrepreneurial efforts, technopreneurs facilitate the digital transformation of businesses, allowing them to adopt data-driven, personalized marketing approaches that align with current market trends and consumer expectations. The study also highlights the substantial impact of these innovations on customer experience, with tools like chatbots, predictive analytics, and real-time support shaping more interactive and satisfying interactions with consumers.

Despite the positive contributions of technopreneurs, the study acknowledges the challenges they face, including resource limitations, regulatory barriers, and resistance to technological adoption. These obstacles can hinder the pace of innovation, and overcoming them requires strategic support from businesses, policymakers, and the wider entrepreneurial ecosystem. The findings also underscore the need for ongoing research into the long-term effects of smart marketing innovations, the influence of external factors, and the adoption of emerging technologies. Future research should aim to explore these dimensions further to build a more comprehensive understanding of the evolving role of technopreneurs in the marketing landscape.

Overall, this study emphasizes that technopreneurs play a crucial role in shaping the future of smart marketing. Their innovative solutions not only enhance the effectiveness of marketing strategies but also drive the digital transformation of industries, positioning businesses for success in an increasingly competitive, tech-driven marketplace. By fostering an environment that supports technopreneurship and technological innovation, businesses and policymakers can ensure that smart marketing continues to evolve and thrive.



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APPENDICES

APPENDIX A GANTT CHART PSM 1

		PSM 1														
		Weeks (Target within 15 weeks)														
No.	Activities	1	2	3	4	5	6	7	8	9	1	1	1	13	14	15
											U	I	2			
1	Briefing PSM 1								S E							
2	Topic Selection								M							
3	Write Chapter1: Introduction								E S T							
4	Correction of Chapter 1:								E R B							
5	Write Chapter 2: Literature Review	(A							R E A							
6	Correction of Literature Review								K							
7	Write Chapter 3: Research Method	Y		ين		7	:2:	:5	4	s./	ون	ود				
8	Correction of chapter 3: Research Method	KN	IK	AL	M	AL.	AY	 SI/	A I	ЛE	LA	K/				
9	Final Draft submission															
10	Report Correction															
11	Slide preparation															
12	Presentation PSM 1															
13	Report Submission															

APPENDIX B GANTT CHART PSM 2

	Activities	PSM 2														
No		Weeks (Target within 15 weeks)														
		1	2	3	4	5	6	7	8	9	1	1	1	13	14	15
											0	1	2			
1	Completion of Questionnaire															
2	Distribute Questionnaire															
3	Data collection and pilot															
4	Data analysis	n K														
5	Completion of data analysis	7														
6	Chapter 4: Discussion, Analysis															
7	Completion:Chapter 4)		zi		ñ	: 2 :	:5	4		ور	ود				
8	Write Chapter 5: Conclusion	KN	IK	AL	M		AY	÷ SI/		ЛE	LA	K/				
9	Complete Chapter 5															
10	Turnitin and report correction															
11	Submit Final Draft															
12	Slide preparation															
13	Presentation															
14	Report correction															
15	Report Submission															

APPENDIX C QUESTIONNAIRE



Bachelor of Technoprenurship with Honours Faculty of Technology Management and Technopreneurship Universiti Teknikal Malaysia Melaka (UTeM)

Research Project Survey Questionnaire:

ROLE OF TECHNOPRENEURS IN DEVELOPING INNOVATION OF SMART MARKETING

This questionnaire consists of **five sections** (**A**, **B**, **C**, **D**, **and E**). Please answer all the questions. Your time and effort are greatly appreciated. Thank you!

Statement of Confidentiality:

All of the information is confidential and only will be using for research purposes.

References:

NURLIYANA BINTI ABD HALIM

Bachelor of Technopreneurship With Honours Faculty of Technology Management and Technopreneurship **Dr. Norun Najjah Binti Ahmat** Supervisor Faculty of Technology Management and Technopreneurship
SECTION A: DEMOGRAPHIC PROFILE

This section relates with your background in brief.

Q1: Gender



Q2:	Age
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Q4: Gedget owned



SECTION B: To understand the concept of innovation in smart

Rate accordingly.

	Strongly	Disagree	Neutral	Agree	Strongly
	Disagree	(2)	(3)	(4)	Agree
	(1)				(5)
Level of understanding the					
meaning and concept of					
innovation in smart marketing					
To what extent do you agree					
that innovation in smart					
marketing is important for					
business growth?					
Used innovative tools like data					
analytics, AI, or automation for					
marketing purposes easy					
AI that has the most potential					
to drive innovation in smart		. /			
marketing	Ŋ		ىتى ي	_ س	اويۇ

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SECTION C: To observe the role of technopreneurs in

	Strongly	Disagree	Neutral	Agree	Strongly
	Disagree	(2)	(3)	(4)	Agree
	(1)				(5)
Technologies are often introduced					
by technopreneurs to increase the					
effectiveness of smart marketing?					
Internet of Things (IoT)					
approaches do you often use in					
your smart marketing strategy.					
Technology Implementation is					
challenges for technopreneurs					
face in developing innovations for					
smart marketing					
To what extent do you agree that					
the role of technopreneurs is	-	S	ىخى د	ہ مربد	او در
critical in driving smart marketing	•*	•	<u> </u>		
innovation?	NIKAL	MALA	YSIA	MEL	AKA
Do you believe that					
technopreneurs can bring about a					
huge change in today's marketing					
approach?					

SECTION D: To investigate the potential of technopreneurs in

	Strongly	Disagree	Neutral	Agree	Strongly
	Disagree	(2)	(3)	(4)	Agree
	(1)				(5)
Gamification Platforms approaches					
technopreneurs can use to enhance					
smart marketing.					
Do you thing Technology infrastructure					
the biggest challenges that					
technopreneurs face in developing					
smart marketing?					
Cost of technology development is					
main obstacles technopreneurs face in					
developing innovations for smart					
marketing.					
To what extent do you feel					
technopreneurs have the potential to					
develop innovation in smart marketing?	Pii	Ri j	ر سب	وية	
Collaboration with technology	60	• • •			
companies is the resources that do you					
need to enhance innovation in smart					
marketing.					