# CHATGPT AS A DIGITAL ASSISTANT FOR STARTUP ENTREPRENEURS

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# DECLARATION

I declare that this thesis entitled “ChatGPT as a Digital Assistant for Startup Entrepreneurs” is the result of my own research except as cited in the references. The thesis has not been accepted to any degree and is not concurrently submitted in candidature of any other degree.



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# APPROVAL

I/We hereby declare that I/We have read through this thesis entitled "ChatGPT as a Digital Assistant for Startup Entrepreneurs" and in my/our opinion, this thesis is complying the partial fulfillment for awarding the award of the degree of Bachelor of Technology Management (Technopreneurship) With Honors.

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# DEDICATION

This project is dedicated to my family and friends, whose unwavering support and encouragement have been a constant source of motivation throughout my academic journey. Your belief in me has made this accomplishment possible. To Dr. Norun Najjah Binti Ahmat, my supervisor, thank you for your invaluable guidance, insights, and patience. Your expertise and advice have been instrumental in shaping this research and bringing it to fruition. To my fellow students and aspiring entrepreneurs, may this work inspire you to explore the transformative potential of AI technologies like ChatGPT. Let it serve as a testament to the endless possibilities that innovation and determination can achieve. Lastly, to all the entrepreneurs striving to make their mark, may this study provide you with the insights and tools to harness the power of AI, driving your ventures towards success and making a positive impact on the world.

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# ABSTRACT

The integration of artificial intelligence (AI) technologies into entrepreneurial activities has garnered significant attention in recent years. This study investigates the role of ChatGPT, a language generation model developed by OpenAI, as a digital assistant for startup entrepreneurs. Employing a mixed-method approach, the research explores the impact of ChatGPT usage on entrepreneurial outcomes and addresses the challenges and opportunities associated with its implementation.

The research methodology involves a geographically diverse sample of entrepreneurs from Malaysia, utilizing both primary and secondary data sources. Quantitative data is collected through Google Forms surveys and analysed using IBM SPSS Statistics software, employing techniques such as descriptive statistics, Pearson's correlation analysis, and multiple linear regression. Qualitative insights are derived from semi-structured interviews and analysed using content analysis and thematic analysis methods.

The study finds that ChatGPT usage is positively associated with various entrepreneurial outcomes, including operational efficiency, customer engagement, and innovation. However, challenges such as data privacy concerns and integration complexities are identified as barriers to adoption. The research framework developed in this study provides a structured approach to understanding the relationships between ChatGPT usage, entrepreneurial challenges, and outcomes.

The findings contribute to the growing body of literature on AI-enabled entrepreneurship, offering practical insights for startup entrepreneurs and policymakers alike. By elucidating the benefits and limitations of ChatGPT as a digital assistant, this study informs strategic decision-making processes and facilitates the effective utilization of AI technologies in entrepreneurial endeavours.

Keywords: *Artificial Intelligence (AI), Entrepreneurs*

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# CHAPTER 1

# INTRODUCTION

## 1.1 Purpose of the study

In recent years, the emergence of AI technologies, particularly conversational agents like ChatGPT, has sparked widespread discussions about their transformative potential across various industries. As observed through news articles, social media discussions, and industry reports, there is a growing anticipation of AI's disruptive influence, with predictions of job displacement alongside the creation of new entrepreneurial opportunities.

Against this backdrop, the primary purpose of this study is to investigate the implications of ChatGPT, an advanced AI tool, for startup entrepreneurs. Specifically, the research aims to explore how ChatGPT can serve as a catalyst for innovation and empowerment within the entrepreneurial ecosystem. By delving into its capabilities, limitations, and potential applications, this study seeks to shed light on the ways in which ChatGPT can facilitate the creation, growth, and sustainability of startup ventures.



Moreover, given the researcher's academic background in business entrepreneurship, there is a particular interest in examining the intersection of AI technology and entrepreneurial endeavors. By understanding how ChatGPT can augment entrepreneurial decision-making, resource allocation, and market engagement, this study endeavors to provide valuable insights for aspiring and existing entrepreneurs navigating the rapidly evolving business landscape.

Through a comprehensive examination of existing literature, empirical research, and practical insights, this study aims to contribute to the academic discourse on AI entrepreneurship while offering actionable recommendations for entrepreneurs, policymakers, and industry stakeholders alike. By elucidating the potential of ChatGPT as a strategic asset for startup success, this research endeavors to empower entrepreneurs to harness the transformative power of AI in driving innovation, growth, and societal impact.

## 1.2 Problem statement

The rapid advancement of artificial intelligence (AI) technologies, particularly conversational agents like ChatGPT, has created significant buzz in both academic and industry circles. Prominent discussions in the media and scholarly articles highlight the potential of AI to revolutionize various sectors, including the entrepreneurial landscape. While AI tools promise to streamline operations, enhance decision-making, and create innovative business opportunities, there is also concern about the displacement of jobs and the readiness of entrepreneurs to effectively integrate these technologies into their ventures.

Despite the recognized potential of ChatGPT to support and transform startup activities, there is a noticeable gap in understanding how startup entrepreneurs can best leverage this technology. Current literature predominantly focuses on the technical capabilities of ChatGPT and its broader economic impacts, leaving a critical gap in practical, entrepreneur-focused applications. Entrepreneurs, particularly those in the early stages of business development, may struggle to navigate and utilize such advanced tools without clear guidance and real-world examples.

Moreover, the entrepreneurial ecosystem is characterized by unique challenges, such as resource constraints, market uncertainties, and the need for rapid decision-making. There is a pressing need to investigate how ChatGPT can address these specific challenges and what role it can play in enhancing entrepreneurial success.



**This study aims to address the following problems:**

1. The lack of comprehensive understanding of how ChatGPT can be specifically applied to support startup entrepreneurs.

2. The need to explore the practical benefits and limitations of ChatGPT as a digital assistant in the entrepreneurial context.

3. The necessity to provide actionable insights and recommendations for entrepreneurs on effectively integrating ChatGPT into their business strategies.

## 1.3 Research Questions

To address the identified problems and fulfil the purpose of this study, the following research questions have been formulated:

**1. What are the underlying principles and technologies behind ChatGPT's natural language processing capabilities?**

This question aims to explore the foundational aspects of ChatGPT, including its architecture, machine learning algorithms, and the natural language processing techniques it employs. Understanding these principles is crucial for comprehending how ChatGPT functions and its potential applications in various domains.

**2. What are the common challenges and pain points faced by entrepreneurs in their daily operations?**

This question seeks to identify and analyze the specific difficulties and obstacles that entrepreneurs encounter in their day-to-day business activities. By gaining insights into these challenges, the study can better understand the context in which ChatGPT might provide valuable support and solutions.

**3. How do entrepreneurs perceive the usefulness and effectiveness of ChatGPT in addressing their needs and challenges?**

This question aims to evaluate the perceptions and experiences of entrepreneurs who have interacted with ChatGPT. It will assess the tool’s practical benefits, usability, and overall effectiveness in meeting the specific needs of startup entrepreneurs. The findings will help determine the extent to which ChatGPT can enhance entrepreneurial operations and decision-making processes.

## 1.4 Research Objective

The primary objectives of this study are to explore and evaluate the potential of ChatGPT as a digital assistant for startup entrepreneurs. Specifically, the research aims to achieve the following objectives:

**1. Understanding ChatGPT**

To comprehensively understand the underlying principles and technologies behind ChatGPT's natural language processing capabilities. This includes examining its architecture, machine learning algorithms, and the methods it uses to interpret and generate human-like text. This foundational knowledge will provide a basis for evaluating ChatGPT's applications and potential benefits.

**2. Identifying Entrepreneurial Needs for Assistance**

To identify and analyze the common challenges and pain points faced by entrepreneurs in their daily operations. By conducting interviews, surveys, and literature reviews, the study aims to gather detailed insights into the specific areas where entrepreneurs require support and how these needs can be addressed through digital tools like ChatGPT.

**3. Assessing the Efficacy of ChatGPT as an Entrepreneurial Assistant**

To assess the perceived usefulness and effectiveness of ChatGPT in addressing the needs and challenges of entrepreneurs. This involves evaluating entrepreneurs' experiences and feedback regarding ChatGPT's practical benefits, usability, and overall impact on their business operations. The findings will help determine the extent to which ChatGPT can enhance productivity, decision-making, and overall business success for startup entrepreneurs.

## 1.5 Scope of Study

This study focuses on exploring the potential of ChatGPT as a digital assistant for startup entrepreneurs. The scope of the study is defined by the following parameters:

**1. Technological Exploration:**

The study will delve into the underlying principles and technologies of ChatGPT, specifically its natural language processing (NLP) capabilities. This includes an examination of its architecture, machine learning algorithms, and the methods it uses to interpret and generate human-like text.

**2. Target Population:**

The primary focus will be on startup entrepreneurs, particularly those in the early stages of business development. The study will consider a diverse range of industries to ensure a comprehensive understanding of entrepreneurial needs.



**3. Geographical Focus:**

While the principles and findings may have broader applicability, the study will primarily focus on entrepreneurs within a specific geographical region or country to provide context-specific insights. This could include local startup ecosystems, regional support structures, and market dynamics.

**4. Data Collection:**

Data will be collected through a combination of literature reviews, surveys, and interviews with entrepreneurs. This mixed-method approach will provide both quantitative and qualitative insights into the challenges faced by entrepreneurs and their perceptions of ChatGPT.

**5. Evaluation Metrics:**

The effectiveness of ChatGPT as an entrepreneurial assistant will be assessed using several metrics, including usability, satisfaction, task completion rates, and perceived value. Feedback from entrepreneurs will be crucial in evaluating these aspects.

**6. Limitations:**

The study will acknowledge certain limitations, such as the potential for bias in self-reported data from entrepreneurs and the evolving nature of AI technologies which may influence the findings over time.

## 1.6 Limitations of Study

While this study aims to provide valuable insights into the potential of ChatGPT as a digital assistant for startup entrepreneurs, it is important to acknowledge several limitations that may impact the findings and conclusions:



**1. Technological Limitations:**

ChatGPT, like any AI technology, has inherent limitations related to its training data, algorithms, and capabilities. The study's findings are based on the current state of ChatGPT and may not account for future advancements or changes in AI technology.

**2. Sample Size and Diversity:**

The study will be limited by the number and diversity of entrepreneurs who participate in the surveys and interviews. A limited sample size or lack of diversity in participants may affect the generalizability of the findings to the broader entrepreneurial population.

**3. Geographical Focus:**

Although the study may have broader implications, it will primarily focus on a specific geographical region or country. The findings may not fully capture the entrepreneurial challenges and opportunities in different cultural, economic, or regulatory environments.

**4. Self-Reported Data:**

Much of the data collected will be based on self-reported information from entrepreneurs, which may be subject to biases such as social desirability bias or recall bias. Participants may also have varying levels of familiarity with AI technologies, influencing their responses.

**5. Dynamic Nature of Entrepreneurship:**

The entrepreneurial landscape is dynamic and constantly evolving. The challenges, needs, and opportunities faced by entrepreneurs can change rapidly due to market trends, technological advancements, and economic conditions. The study's findings may therefore have a limited shelf-life.



**6. Evaluation of ChatGPT's Effectiveness:**

Assessing the effectiveness of ChatGPT as an entrepreneurial assistant will rely on subjective measures such as user satisfaction and perceived usefulness. These evaluations may vary widely among participants and may not fully capture the tool's objective performance metrics.

**7. Scope of Application:**

The study will focus on specific applications of ChatGPT relevant to startup entrepreneurs. It may not cover all possible uses or explore the tool's potential in more established businesses or other contexts.

## 1.7 Significant of the Study

The significance of this study lies in its potential contributions to both the academic field of entrepreneurship and the practical domain of startup management through the application of AI technologies, specifically ChatGPT. The key contributions and impacts of this study are outlined below:

**1. Advancing Knowledge in AI and Entrepreneurship:**

This study aims to bridge the gap between AI technology and entrepreneurial practice by providing a detailed exploration of how ChatGPT can be utilized by startup entrepreneurs. It will contribute to academic literature by offering new insights into the practical applications of AI in the entrepreneurial context.

**2. Empowering Startup Entrepreneurs:**

By identifying the challenges faced by entrepreneurs and evaluating how ChatGPT can address these needs, the study seeks to empower entrepreneurs with actionable knowledge and tools. This can help them enhance their operational efficiency, decision-making processes, and overall business performance.



**3. Guiding Technology Integration:**

The findings from this study can provide practical guidance for entrepreneurs on how to integrate ChatGPT into their business operations. This includes best practices, potential pitfalls, and strategies for maximizing the benefits of AI assistance.

**4. Influencing Policy and Support Programs:**

Policymakers and support organizations can benefit from the study's insights into the specific needs of entrepreneurs and the potential of AI tools. This can inform the design of policies, support programs, and resources that facilitate the adoption of AI technologies in the entrepreneurial sector.

**5. Promoting Innovation and Competitiveness:**

By demonstrating the potential of ChatGPT to drive innovation and competitiveness, this study can encourage more entrepreneurs to explore and adopt advanced AI tools. This can lead to the creation of more innovative startups and contribute to the overall dynamism and growth of the entrepreneurial ecosystem.

**6. Future Research Directions:**

The study will highlight areas where further research is needed, particularly in understanding the long-term impacts of AI integration in startups and the evolving capabilities of technologies like ChatGPT. This can inspire subsequent studies and initiatives aimed at enhancing the synergy between AI and entrepreneurship.

**7. Educational Resource:**

Study can serve as an educational resource for students, educators, and practitioners in the fields of business and technology. It provides a practical case study on the intersection of AI and entrepreneurship, offering valuable lessons and insights for future entrepreneurs and business leaders.

# CHAPTER 2

# LITERATURE REVIEW

## 2.1 Introduction

The literature review serves as a critical component of this study, providing a comprehensive analysis of existing research and theoretical frameworks related to the use of ChatGPT as a digital assistant for startup entrepreneurs. This chapter aims to contextualize the study within the broader academic and practical discourse on artificial intelligence (AI), natural language processing (NLP), and entrepreneurship.

In recent years, the rapid advancements in AI technologies, particularly in NLP, have led to the development of sophisticated conversational agents like ChatGPT. These technologies promise to transform various industries by enhancing efficiency, decision-making, and innovation. However, the application of such technologies in the entrepreneurial context remains underexplored, necessitating a detailed examination of their potential benefits and challenges.



This chapter is organized into several sections to systematically address the key aspects of the study. The first section, Understanding ChatGPT and Natural Language Processing, delves into the technological foundations of ChatGPT, providing an overview of its architecture and the NLP techniques it employs. This is followed by Entrepreneurial Needs and Challenges, which discusses the common challenges faced by entrepreneurs and the existing solutions available to them.

The third section, Applications of AI in Entrepreneurship, reviews the current literature on the use of AI tools in entrepreneurial settings, highlighting both successful implementations and areas needing further research. ChatGPT as an Entrepreneurial Assistant then focuses specifically on the potential applications and effectiveness of ChatGPT in addressing the needs of startup entrepreneurs.

Finally, Synthesis of Literature and Identification of Research Gap synthesizes the key findings from the reviewed literature and identifies the gaps that this study aims to fill. By providing a thorough analysis of existing research, this literature review

establishes a solid foundation for the subsequent investigation into the role of ChatGPT as a valuable tool for startup entrepreneurs.

## 2.2 Understanding ChatGPT and Natural Language Processing

This section provides an in-depth exploration of ChatGPT, its technological underpinnings, and the natural language processing (NLP) techniques it employs. Understanding these foundational aspects is crucial for appreciating how ChatGPT can be utilized as a digital assistant for startup entrepreneurs.

### 2.2.1 Overview of ChatGPT

ChatGPT, developed by OpenAI, is a state-of-the-art conversational agent that leverages the Generative Pre-trained Transformer (GPT) architecture. The GPT model is a type of transformer-based neural network designed to generate human-like text based on the input it receives. The current iteration, GPT-4, represents a significant advancement over its predecessors, offering improved performance in understanding and generating text.



The core of ChatGPT's functionality lies in its ability to process and generate coherent, contextually appropriate responses. This capability is underpinned by extensive training on diverse datasets, encompassing a wide range of topics and linguistic nuances. As a result, ChatGPT can engage in meaningful dialogues, provide information, and assist with various tasks, making it a versatile tool for different applications.

### 2.2.2 Natural Language Processing Techniques

Natural language processing (NLP) is a subfield of artificial intelligence that focuses on the interaction between computers and humans through natural language. The following are key NLP techniques utilized by ChatGPT:

- **Tokenization:** This involves breaking down text into smaller units, such as words or subworlds, which can be processed by the model. Tokenization enables ChatGPT to handle large volumes of text efficiently and accurately.
- **Embedding:** In this process, words or tokens are converted into numerical vectors that capture semantic meaning. These embeddings allow the model to understand the relationships between different words and phrases.
- **Attention Mechanisms:** A crucial component of the transformer architecture, attention mechanisms enable the model to focus on relevant parts of the input text when generating responses. This helps in maintaining coherence and relevance in the dialogue.
- **Pre-training and Fine-tuning:** ChatGPT undergoes a two-stage training process. First, it is pre-trained on a large corpus of text to learn general language patterns. Subsequently, it is fine-tuned on specific datasets to enhance its performance in particular domains or tasks.

### 2.2.3 Advancements and Limitations in NLP

While significant advancements have been made in NLP, including the development of sophisticated models like GPT-4, there are inherent limitations and challenges:

- **Contextual Understanding:** Although ChatGPT can generate contextually appropriate responses, it sometimes struggles with long-term context retention and may produce inconsistent answers in extended dialogues.
- **Bias and Fairness:** The training data used for NLP models often contain biases present in human language. As a result, ChatGPT may inadvertently generate biased or inappropriate content, necessitating ongoing efforts to mitigate these issues.
- **Computational Resources:** Training and deploying large NLP models require substantial computational power and resources, which can be a barrier for widespread adoption and accessibility.

### 2.2.4 Implications for Entrepreneurial Use

Understanding the capabilities and limitations of ChatGPT is essential for evaluating its potential as a digital assistant for startup entrepreneurs. By leveraging its advanced NLP techniques, ChatGPT can assist with tasks such as customer support, content creation, market research, and more. However, entrepreneurs must also be aware of the model's limitations and employ strategies to mitigate potential issues, such as bias and contextual inaccuracies.

In summary, ChatGPT represents a significant advancement in conversational AI, underpinned by sophisticated NLP techniques. Its potential applications for entrepreneurs are vast, but careful consideration of its limitations is crucial for effective utilization.

## 2.3 Entrepreneurial Needs and Challenges

Entrepreneurs face a myriad of challenges as they navigate the complexities of starting and growing a business. Understanding these needs and challenges is crucial to evaluating how tools like ChatGPT can provide meaningful support. This section delves into the common issues faced by entrepreneurs and the existing solutions available to them.

### 2.3.1 Common Challenges Faced by Entrepreneurs

1. **Resource Constraints:**

- **Financial Limitations:** Many startups struggle with securing adequate funding. Limited financial resources can restrict operations, marketing, product development, and hiring.

- **Human Resources:** Startups often operate with a lean team, leading to multitasking and potential skill gaps. Finding and retaining talent can be particularly challenging.

2. **Time Management:**

- **Prioritization:** Entrepreneurs frequently juggle multiple roles and responsibilities, making effective prioritization critical. The need to balance strategic planning with day-to-day operations often leads to burnout and inefficiency.
- **Administrative Burden:** Routine administrative tasks, such as bookkeeping, scheduling, and customer service, can consume significant time that could be better spent on core business activities.

3. **Market Knowledge and Strategy:**

- **Market Research:** Understanding market trends, customer preferences, and competitive dynamics is vital but resource intensive. Limited access to comprehensive market data can impede strategic decision-making.
- **Marketing and Sales:** Developing effective marketing strategies and building a customer base are ongoing challenges. Entrepreneurs must continuously adapt to changing market conditions and customer behaviours.

4. **Innovation and Product Development:**

- **Idea Validation:** Turning a business idea into a viable product or service requires rigorous validation. Entrepreneurs must navigate the uncertainties of product-market fit and customer acceptance.
- **Development Cycles:** Efficiently managing product development cycles while ensuring quality and innovation is a significant challenge, especially with constrained resources.

5. **Regulatory and Legal Compliance:**

- **Navigating Regulations:** Complying with industry regulations, legal requirements, and taxation laws can be complex and time-consuming. Non-compliance can lead to legal issues and financial penalties.

6. **Networking and Partnerships:**

- **Building Relationships:** Establishing and maintaining relationships with investors, partners, suppliers, and customers is crucial for business growth. Networking effectively requires strategic effort and can be difficult for first-time entrepreneurs.

### 2.3.2 Existing Solutions and Support Systems

1. **Business Incubators and Accelerators:**

- These programs provide startups with mentorship, funding, resources, and networking opportunities. They help entrepreneurs refine their business models and accelerate growth.



2. **Government Grants and Subsidies:**

- Many governments offer financial support to startups through grants, subsidies, and tax incentives. These initiatives aim to reduce financial burdens and promote innovation.

3. **Online Resources and Communities:**

- Digital platforms and communities provide entrepreneurs with access to educational resources, industry insights, and peer support. Websites, forums, and social media groups offer valuable networking and knowledge-sharing opportunities.

4. **Professional Services:**

- Entrepreneurs can outsource specialized tasks to professionals, such as accountants, legal advisors, and marketing consultants. This allows them to focus on core business activities while leveraging expert knowledge.

5. **AI and Digital Tools:**

- Various AI-driven tools and software applications assist with tasks like market research, customer relationship management (CRM), project management, and marketing automation. These tools help entrepreneurs streamline operations and make data-driven decisions.

### 2.3.3 Identifying Gaps in Support Systems

Despite the availability of various support systems, several gaps remain that tools like ChatGPT could address:



1. **Accessibility and Affordability:**

- Many existing support systems and professional services are costly, making them inaccessible to early-stage startups with limited budgets. Affordable AI tools can democratize access to valuable resources and expertise.

2. **Comprehensive Assistance:**

- Entrepreneurs need comprehensive support that integrates various functions, from market research to customer service. ChatGPT's versatility can provide a unified solution for multiple business needs.

3. **Real-time Support:**

- Immediate assistance and real-time problem-solving are crucial for entrepreneurs dealing with urgent issues. ChatGPT can offer instant responses and support, enhancing operational efficiency.

4. **Scalability:**

- As businesses grow, their support needs evolve. AI tools like ChatGPT can scale with the business, offering consistent support without the proportional increase in costs.

In summary, entrepreneurs face numerous challenges that require diverse and dynamic support systems. While existing solutions provide valuable assistance, there are significant gaps that ChatGPT, with its advanced NLP capabilities, can potentially fill. Understanding these needs and challenges sets the stage for evaluating how ChatGPT can be an effective digital assistant for startup entrepreneurs.

## 2.4 Applications of AI in Entrepreneurship

Artificial Intelligence (AI) has become a transformative force across various industries, including entrepreneurship. This section explores the current applications of AI in entrepreneurship, examining how AI tools are utilized to enhance business operations, drive innovation, and address the challenges faced by entrepreneurs.



### 2.4.1 Enhancing Operational Efficiency

1. **Automation of Routine Tasks:**

- AI tools automate repetitive and time-consuming tasks such as data entry, scheduling, and inventory management. This reduces the administrative burden on entrepreneurs, allowing them to focus on strategic activities.
- Example: AI-powered chatbots handle customer inquiries, provide support, and manage reservations, significantly reducing the need for human intervention.

2. **Financial Management:**

- AI-driven financial tools assist with budgeting, forecasting, expense tracking, and financial analysis. These tools provide entrepreneurs with real-time insights into their financial health and help in making informed decisions.
- Example: Automated bookkeeping software uses AI to categorize expenses, generate financial reports, and ensure compliance with tax regulations.

### 2.4.2 Improving Customer Experience

1. **Personalized Marketing and Sales:**

- AI algorithms analyse customer data to deliver personalized marketing messages and product recommendations. This enhances customer engagement and increases conversion rates.
- Example: E-commerce platforms use AI to recommend products based on customer browsing and purchase history, improving the shopping experience.



2. **Customer Relationship Management (CRM):**

- AI-enhanced CRM systems track customer interactions, predict customer needs, and automate follow-ups. This helps businesses build stronger relationships and improve customer satisfaction.
- Example: AI-driven CRM tools like Salesforce Einstein analyse customer data to provide actionable insights and automate routine CRM tasks.

### 2.4.3 Driving Innovation and Product Development

1. **Market Research and Analysis:**

- AI tools analyse market trends, competitor activities, and customer feedback to identify opportunities and threats. This aids entrepreneurs in developing innovative products and strategies.

- Example: AI-driven market research platforms analyse social media trends and online reviews to provide insights into consumer preferences and emerging market trends.

2. **Product Design and Testing:**

- AI technologies such as machine learning and predictive analytics help in optimizing product design and conducting virtual testing. This reduces development time and costs.
- Example: AI-powered design tools generate product prototypes and simulate performance under various conditions, accelerating the development process.

### 2.4.4 Facilitating Decision-Making

1. **Data-Driven Insights:**

- AI tools process vast amounts of data to generate actionable insights and predictive analytics. Entrepreneurs can use these insights to make informed strategic decisions.
- Example: Business intelligence platforms use AI to analyse sales data, customer behaviour, and market conditions, providing entrepreneurs with detailed reports and forecasts.

2. **Risk Management:**

- AI models assess risks by analysing historical data and identifying patterns. This helps entrepreneurs mitigate potential risks and make proactive decisions.
- Example: AI-driven risk management tools evaluate financial risks, market volatility, and supply chain disruptions, enabling businesses to develop contingency plans.

### 2.4.5 Case Studies and Examples

1. **AI in Retail:**

- Retail startups leverage AI for inventory management, demand forecasting, and personalized shopping experiences. AI helps in optimizing supply chains and enhancing customer satisfaction.
- Example: Stitch Fix uses AI algorithms to personalize clothing recommendations for customers, improving customer retention and sales.

2. **AI in Healthcare:**

- Healthcare startups use AI to develop diagnostic tools, optimize patient care, and streamline administrative processes. AI enhances the accuracy and efficiency of medical services.
- Example: Zebra Medical Vision uses AI to analyse medical imaging data, assisting radiologists in diagnosing diseases with higher accuracy.

3. **AI in Financial Services:**

- Fintech startups employ AI for fraud detection, credit scoring, and personalized financial advice. AI improves the security and accessibility of financial services.
- Example: Kabbage uses AI to analyse business performance data and provide instant credit decisions for small businesses.



### 2.4.6 Challenges and Considerations

1. **Data Privacy and Security:**

- The use of AI involves handling sensitive data, raising concerns about privacy and security. Entrepreneurs must ensure compliance with data protection regulations and implement robust security measures.
- Example: Implementing encryption, access controls, and regular audits to protect customer data and maintain trust.

2. **Ethical Considerations:**

- AI systems must be designed and used ethically, avoiding biases and ensuring fairness. Entrepreneurs need to address ethical issues in AI implementation.
- Example: Regularly auditing AI algorithms for bias, ensuring transparency, and promoting diversity in data used for training models.

3. **Adoption and Integration:**

- Integrating AI tools into existing business processes can be challenging. Entrepreneurs need to invest in training and infrastructure to fully leverage AI capabilities.
- Example: Providing training for employees on how to use AI tools effectively and ensuring seamless integration with other business systems.

In summary, AI offers numerous applications that can significantly enhance entrepreneurship by improving efficiency, customer experience, innovation, and decision-making. However, entrepreneurs must also address the associated challenges to fully realize the benefits of AI technologies.



## 2.5 ChatGPT as an Entrepreneurial Assistant

ChatGPT, a cutting-edge AI language model developed by OpenAI, holds significant potential as a digital assistant for entrepreneurs. This section examines the specific applications of ChatGPT in entrepreneurship, evaluating its effectiveness in addressing various needs and challenges faced by startup founders.

### 2.5.1 Applications of ChatGPT in Entrepreneurship

1. **Customer Support and Engagement:**

- **24/7 Customer Service:** ChatGPT can handle customer inquiries around the clock, providing timely and accurate responses. This ensures that customer service is always available, even outside business hours.

- **Personalized Interaction:** By analysing customer data, ChatGPT can offer personalized recommendations and solutions, enhancing customer satisfaction and loyalty.

2. **Market Research and Insights:**

- **Data Analysis:** ChatGPT can process and analyse large volumes of data from various sources, including social media, market reports, and customer feedback. This provides entrepreneurs with valuable insights into market trends and customer preferences.
- **Competitor Analysis:** The AI can gather and summarize information about competitors, helping entrepreneurs stay informed about market dynamics and competitive strategies.

3. **Content Creation and Marketing:**

- **Content Generation:** ChatGPT can assist in creating high-quality content for blogs, social media, newsletters, and marketing materials. This helps maintain a consistent and engaging online presence.
- **SEO Optimization:** The AI can suggest keywords and optimize content for search engines, improving the visibility and reach of marketing campaigns.



4. **Administrative Assistance:**

- **Scheduling and Reminders:** ChatGPT can manage calendars, schedule meetings, and set reminders, helping entrepreneurs stay organized and manage their time effectively.
- **Document Drafting:** The AI can draft emails, reports, proposals, and other business documents, reducing the administrative burden on entrepreneurs.

5. **Decision Support:**

- **Scenario Analysis:** ChatGPT can simulate different business scenarios and analyse potential outcomes, assisting entrepreneurs in making informed decisions.
- **Risk Assessment:** The AI can evaluate potential risks and suggest mitigation strategies based on historical data and predictive analytics.

### 2.5.2 Advantages of Using ChatGPT

1. **Cost Efficiency:**

- ChatGPT provides a cost-effective alternative to hiring full-time staff for various tasks. By automating routine activities, entrepreneurs can save on labor costs and allocate resources more efficiently.

2. **Scalability:**

- As businesses grow, the demand for support and administrative tasks increases. ChatGPT can scale with the business, offering consistent performance without the need for proportional increases in human resources.

3. **Availability:**

- Unlike human employees, ChatGPT is available 24/7, providing continuous support without breaks. This ensures that critical tasks and customer interactions are handled promptly.

4. **Consistency and Accuracy:**

- ChatGPT delivers consistent and accurate information based on its training data. This reduces the likelihood of errors and ensures a high level of reliability in task execution.

### 2.5.3 Limitations and Considerations

1. **Contextual Understanding:**

- While ChatGPT excels at generating coherent responses, it may struggle with understanding complex or nuanced contexts. Entrepreneurs must verify critical information and decisions made by the AI.

2. **Bias and Ethical Concerns:**

- The AI model can inadvertently reflect biases present in its training data. Entrepreneurs need to be aware of this and take steps to mitigate bias in AI-generated outputs.

3. **Data Privacy:**

- Using ChatGPT involves handling sensitive business and customer data. Entrepreneurs must ensure compliance with data protection regulations and implement robust security measures.

4. **Human Touch:**

- Certain tasks, particularly those requiring empathy and personal interaction, may still require a human touch. Entrepreneurs should balance the use of AI with human involvement to maintain strong customer relationships.



### 2.5.4 Case Studies and Practical Examples

1. **Customer Service Enhancement:**

- A startup uses ChatGPT to manage its customer service inquiries. The AI handles common questions and issues, freeing up human agents to focus on more complex cases. This improves response times and customer satisfaction.

2. **Content Marketing:**

- An e-commerce business leverages ChatGPT to generate product descriptions, blog posts, and social media content. The AI ensures a steady stream of high-quality content, boosting online engagement and driving sales.

3. **Market Research:**

- A tech startup employs ChatGPT to analyse social media trends and customer reviews. The insights gained help the company refine its product offerings and tailor marketing strategies to target audiences more effectively.

### 2.5.5 Future Potential and Developments

As AI technology continues to evolve, the capabilities of ChatGPT and similar models are expected to expand. Future developments could include:

1. **Enhanced Contextual Awareness:**

- Improved algorithms and training methods could enable ChatGPT to better understand and respond to complex and nuanced contexts.

2. **Integration with Other Tools:**

- Seamless integration with other business tools and platforms, such as CRM systems, project management software, and financial applications, will enhance ChatGPT's utility and effectiveness.

3. **Advanced Personalization:**

- More sophisticated personalization capabilities could allow ChatGPT to deliver even more tailored and relevant assistance to entrepreneurs and their customers.

In conclusion, ChatGPT offers a wide range of applications that can significantly benefit entrepreneurs by improving efficiency, enhancing customer engagement, and providing valuable insights. However, it is essential to recognize and address its limitations to maximize its potential as an entrepreneurial assistant.

## 2.6 Synthesis of Literature and Identification of Research Gap

This section synthesizes the key findings from the literature reviewed in the previous sections and identifies the gaps that this study aims to address. The synthesis will help contextualize the current state of research on AI and entrepreneurial support tools, particularly ChatGPT, and highlight the unique contributions this study intends to make.

### 2.6.1 Synthesis of Key Findings

1. **Advancements in AI and NLP:**
   - The literature reveals significant advancements in AI and natural language processing (NLP), with models like ChatGPT demonstrating impressive capabilities in generating human-like text and understanding context. These advancements have paved the way for a wide range of applications in various fields, including entrepreneurship.

2. **Entrepreneurial Challenges and Needs:**
   - Entrepreneurs face numerous challenges, including resource constraints, time management, market research, innovation, and compliance with regulations. Existing support systems, such as business incubators, professional services, and AI tools, provide valuable assistance but often fall short in accessibility, comprehensiveness, and scalability.

3. **Applications of AI in Entrepreneurship:**
   - AI tools are increasingly being adopted in entrepreneurship to enhance operational efficiency, improve customer experiences, drive innovation, and facilitate decision-making. Specific applications include automating routine tasks, personalizing customer interactions, generating market insights, and supporting financial management.

4. **Potential of ChatGPT as an Entrepreneurial Assistant:**

- ChatGPT offers diverse applications for entrepreneurs, such as customer support, market research, content creation, administrative assistance, and decision support. Its advantages include cost efficiency, scalability, availability, and consistency. However, limitations related to contextual understanding, bias, data privacy, and the need for human touch persist.

### 2.6.2 Identification of Research Gap

Despite the promising potential of ChatGPT and other AI tools, several gaps in the current research and practical applications have been identified:

1. **Limited Empirical Studies:**

- While theoretical discussions and case studies highlight the potential of AI tools like ChatGPT, there is a lack of empirical research that quantitatively measures their effectiveness and impact on entrepreneurial success. This study aims to provide empirical evidence on how ChatGPT can assist startup entrepreneurs in real-world scenarios.



2. **Specific Needs of Entrepreneurs:**

- Existing literature often addresses the general applications of AI in business but does not sufficiently focus on the specific needs and contexts of startup entrepreneurs. This study will explore how ChatGPT can be tailored to meet the unique challenges faced by entrepreneurs, particularly in early-stage startups.

3. **Longitudinal Impact:**

- Most studies provide a snapshot of the benefits and limitations of AI tools. There is a need for longitudinal research that examines the long-term impact of using ChatGPT on business growth, sustainability, and entrepreneur well-

being. This study will consider the ongoing effects of integrating ChatGPT into entrepreneurial practices.

4. **Integration with Existing Systems:**

- Research often overlooks the practical aspects of integrating AI tools with existing business processes and systems. This study will explore the challenges and best practices for seamlessly incorporating ChatGPT into the daily operations of startups.

5. **Ethical and Social Implications:**

- While the potential biases and ethical concerns associated with AI are acknowledged, there is limited exploration of how these issues can be systematically addressed in entrepreneurial contexts. This study will investigate strategies for mitigating bias and ensuring ethical use of ChatGPT.



### 2.6.3 Contribution of the Study

By addressing these gaps, this study aims to make the following contributions:

1. **Empirical Insights:**

- Provide empirical data on the effectiveness of ChatGPT as a digital assistant for startup entrepreneurs, offering quantitative and qualitative insights into its impact on business operations and success.

2. **Tailored Solutions:**

- Develop tailored applications and best practices for using ChatGPT to meet the specific needs of startup entrepreneurs, enhancing the relevance and practical utility of the AI tool.

3. **Long-term Evaluation:**

- Conduct a longitudinal analysis to understand the sustained impact of ChatGPT on entrepreneurial activities, contributing to a deeper understanding of its benefits and limitations over time.

4. **Integration Framework:**

- Create a framework for effectively integrating ChatGPT with existing business processes and systems, providing practical guidance for entrepreneurs looking to adopt AI tools.

5. **Ethical Guidelines:**

- Propose ethical guidelines and strategies for mitigating bias in AI applications, ensuring that the use of ChatGPT aligns with ethical standards and promotes fairness.



In summary, this study synthesizes existing research on AI, entrepreneurship, and ChatGPT, identifying significant gaps that need to be addressed. By filling these gaps, the study aims to provide valuable insights and practical recommendations for leveraging ChatGPT as an effective digital assistant for startup entrepreneurs.

## 2.7 Proposed Conceptual Framework

The proposed conceptual framework for this study is designed to illustrate the relationship between ChatGPT as a digital assistant and its impact on the entrepreneurial activities and success of startup entrepreneurs. This framework integrates key components derived from the literature review and aims to guide the empirical investigation of ChatGPT's effectiveness in addressing entrepreneurial needs.

### 2.7.1 Components of the Conceptual Framework

1. **ChatGPT as a Digital Assistant:**

- **Capabilities:** The functionalities of ChatGPT, such as customer support, market research, content creation, administrative assistance, and decision support.
- **Integration:** How ChatGPT is integrated into the entrepreneur's business processes and daily operations.

2. **Entrepreneurial Needs and Challenges:**

- **Operational Efficiency:** The need for automation and streamlined processes to enhance productivity.
- **Customer Engagement:** The requirement for effective customer interaction and personalized service.
- **Market Insights:** The necessity of accessing and analyzing market data to inform business decisions.
- **Time Management:** The challenge of managing time effectively across various entrepreneurial tasks.
- **Innovation and Product Development:** The need for continuous innovation and efficient product development cycles.

3. **Outcomes for Entrepreneurs:**

- **Business Performance:** Metrics such as revenue growth, customer acquisition, and retention rates.
- **Operational Efficiency:** Improvements in task completion time, administrative burden, and overall productivity.
- **Customer Satisfaction:** Levels of customer engagement, feedback, and loyalty.
- **Decision Quality:** The accuracy, timeliness, and strategic value of decisions made with the aid of ChatGPT.
- **Entrepreneur Well-being:** The impact on stress levels, work-life balance, and overall satisfaction of the entrepreneur.

4. **Moderating Variables:**

- **Business Stage:** The stage of the startup (e.g., early-stage, growth stage) and how it influences the effectiveness of ChatGPT.
- **Industry:** The specific industry in which the entrepreneur operates and its unique requirements.
- **Entrepreneur's Tech Savviness:** The entrepreneur's familiarity with and ability to leverage AI tools.
- **Resource Availability:** The availability of financial, human, and technological resources to support the integration of ChatGPT.

### 2.7.2 Relationships and Hypotheses

The conceptual framework proposes the following relationships and hypotheses to be tested in the study:

1. **ChatGPT and Operational Efficiency:**

- **Hypothesis 1:** The integration of ChatGPT as a digital assistant positively impacts the operational efficiency of startup entrepreneurs.



2. **ChatGPT and Customer Engagement:**

- **Hypothesis 2:** ChatGPT enhances customer engagement and satisfaction through personalized interactions and timely support.

3. **ChatGPT and Market Insights:**

- **Hypothesis 3:** ChatGPT's capabilities in market research and data analysis provide entrepreneurs with valuable market insights, leading to better-informed business decisions.

4. **ChatGPT and Time Management:**

- **Hypothesis 4:** The use of ChatGPT helps entrepreneurs manage their time more effectively by automating routine tasks and providing administrative assistance.

5. **ChatGPT and Innovation:**

- **Hypothesis 5:** ChatGPT supports innovation and product development by providing insights, generating ideas, and facilitating efficient processes.

6. **Moderating Effects:**

- **Hypothesis 6:** The effectiveness of ChatGPT in enhancing entrepreneurial outcomes is moderated by the business stage, industry, entrepreneur's tech savviness, and resource availability.

### 2.7.3 Diagram of the Conceptual Framework

The conceptual framework can be visually represented as follows:

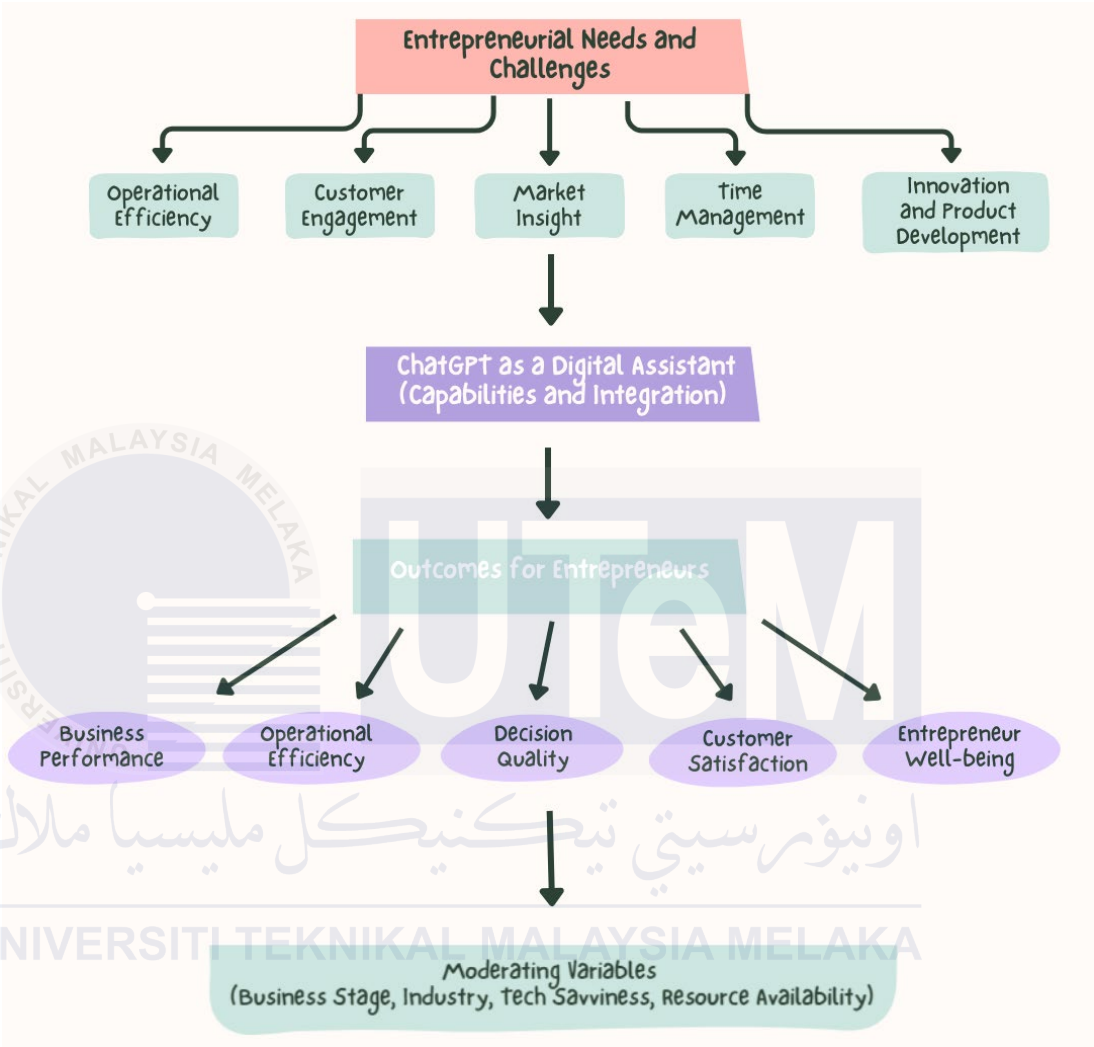



**Figure 2.1 Conceptual Framework**

### 2.7.4 Explanation of the Framework

This framework illustrates how ChatGPT, when integrated into the business processes of startup entrepreneurs, can address key entrepreneurial needs and challenges. The use of ChatGPT is hypothesized to improve various outcomes for entrepreneurs, including business performance, operational efficiency, customer satisfaction, decision quality, and overall well-being. The moderating variables account for contextual factors that may influence the effectiveness of ChatGPT, ensuring a comprehensive understanding of its impact.

In summary, the proposed conceptual framework provides a structured approach to investigating the role of ChatGPT as an entrepreneurial assistant. It highlights the relationships between ChatGPT's functionalities, the needs and challenges of entrepreneurs, and the resulting outcomes, moderated by relevant contextual factors. This framework will guide the empirical analysis and help validate the hypotheses posited in this study.

## 2.8 Summary

In this literature review, the focus has been on exploring the potential of ChatGPT as a digital assistant for startup entrepreneurs. ChatGPT, with its advanced natural language processing capabilities, offers a range of applications in entrepreneurship, including customer support, market research, content creation, and decision support. However, while theoretical discussions and case studies highlight its potential, there is a notable gap in empirical research quantifying its effectiveness. The proposed conceptual framework outlines the relationship between ChatGPT, entrepreneurial needs and challenges, outcomes for entrepreneurs, and moderating variables. This framework sets the stage for investigating the specific impact of ChatGPT on startup success through empirical analysis. Overall, this review underscores the need for empirical studies to validate the efficacy of ChatGPT in addressing the unique challenges faced by entrepreneurs and driving business success.

# CHAPTER 3

# RESEARCH METHODOLOGY

## 3.1 Introduction

The purpose of this chapter is to outline the research methodology employed in this study, which investigates the role of ChatGPT as a digital assistant for startup entrepreneurs. A clear and systematic approach is essential to ensure the reliability and validity of the findings. This chapter will detail the research design, the population and sample selection, the methods of data collection, the techniques for data analysis, and the measures taken to ensure the reliability and validity of the study. Additionally, ethical considerations relevant to the research will be discussed. The methodology adopted will provide a robust framework for addressing the research questions and achieving the objectives of the study.

## 3.2 Research Design

This study employs a mixed-methods research design, which combines both qualitative and quantitative approaches to provide a comprehensive understanding of the role of ChatGPT as a digital assistant for startup entrepreneurs. The mixed-methods design is chosen for its ability to integrate the numerical strength of quantitative research with the depth of qualitative insights, thereby offering a holistic view of the research problem.

**Quantitative Approach:**

The quantitative component involves the use of surveys to gather numerical data on the effectiveness of ChatGPT in enhancing various aspects of entrepreneurial activities. The survey will collect data on key variables such as operational efficiency, customer engagement, market insights, time management, and innovation. The use of Google Forms for the survey ensures a wide reach and ease of data collection.

**Qualitative Approach:**

The qualitative component involves semi-structured interviews to explore the experiences and perceptions of startup entrepreneurs using ChatGPT. These interviews will provide detailed insights into how ChatGPT is integrated into business processes, the benefits and challenges encountered, and the overall impact on entrepreneurial outcomes. The qualitative data will complement the quantitative findings by adding context and depth to the understanding of the research problem.

**Rationale for Mixed-Methods Design:**

The mixed-methods approach is particularly suitable for this study for several reasons:

1. **Comprehensive Data Collection:** Combining quantitative and qualitative data collection methods allows for a more complete and nuanced understanding of the research problem.
2. **Triangulation:** The use of both methods facilitates triangulation, enhancing the reliability and validity of the findings by corroborating evidence from different sources.
3. **Flexibility:** This approach provides flexibility in addressing different aspects of the research questions, allowing for a more thorough exploration of the topic.



In summary, the mixed-methods research design adopted in this study leverages the strengths of both quantitative and qualitative approaches. This design not only quantifies the impact of ChatGPT on entrepreneurial activities but also provides rich, contextual insights into the experiences of startup entrepreneurs. The integration of these methods will enable a comprehensive analysis of ChatGPT's role as an entrepreneurial assistant, ultimately contributing to a deeper understanding of its effectiveness and potential applications.

## 3.3 Population and Sample

**Population:**

The target population for this study includes startup entrepreneurs who have been operating their businesses for less than five years. These entrepreneurs are selected as they are likely to face unique challenges and are in the early stages of business development, where digital tools like ChatGPT can have a significant impact. The population is geographically diverse, including entrepreneurs from Malaysia, to ensure a comprehensive understanding of the research problem within the local context.

**Sample:**

A purposive sampling technique will be employed to select participants who use or have used ChatGPT in their entrepreneurial activities. This technique is chosen to ensure that the sample consists of individuals who have relevant experience with the tool, allowing for more meaningful and focused insights.



**Sample Size:**

- **Quantitative Component**: For the survey, a sample size of 100 startup entrepreneurs will be targeted. This sample size is chosen to ensure sufficient statistical power for quantitative analysis and to capture a diverse range of experiences and perceptions.
- **Qualitative Component:** For the semi-structured interviews, a smaller sample size of 30 startup entrepreneurs will be targeted. This number is sufficient to achieve data saturation, where no new themes are likely to emerge, providing rich and detailed qualitative insights.

**Sampling Procedure:**

1. **Survey (Quantitative):**

- The survey will be distributed online via Google Forms. Recruitment will occur through entrepreneurial networks, social media platforms, startup

incubators, and email invitations. Potential participants will be screened to ensure they meet the criteria of having used ChatGPT in their entrepreneurial activities.

2. **Interviews (Qualitative):**

- Participants for the semi-structured interviews will be selected from the survey respondents who indicate a willingness to participate in follow-up interviews. Additional participants may be recruited through referrals and networking within the entrepreneurial community. Interviews will be conducted via video conferencing to accommodate participants from different geographical locations.

**Inclusion Criteria:**

- Entrepreneurs who have been operating their businesses for less than five years.
- Entrepreneurs who have used ChatGPT as part of their business operations.
- Entrepreneurs based in Malaysia.

**Exclusion Criteria:**

- Entrepreneurs who have not used ChatGPT.
- Entrepreneurs who have been operating their businesses for more than five years.
- Entrepreneurs not based in Malaysia.

By carefully defining the population and employing a purposive sampling technique, this study aims to gather relevant and insightful data from startup entrepreneurs in Malaysia who have experience with ChatGPT. This approach ensures that the findings are both meaningful and applicable to the research questions and objectives.

## 3.4 Data Collection Methods

This study will employ both primary and secondary data collection methods to gather comprehensive information on the use of ChatGPT as a digital assistant for startup entrepreneurs. The primary data will be collected through surveys and interviews, while secondary data will be gathered from relevant literature and existing studies.

**Primary Data Collection:**

1. **Surveys (Google Forms):**

- **Method:** An online survey will be designed using Google Forms to collect quantitative data from startup entrepreneurs. The survey will include a mix of closed and open-ended questions aimed at measuring the effectiveness of ChatGPT in various entrepreneurial tasks.
- **Content:** Questions will cover areas such as operational efficiency, customer engagement, market insights, time management, and innovation. Demographic information about the entrepreneurs and their startups will also be collected.
- **Distribution:** The survey link will be distributed via email, social media platforms, and entrepreneurial networks to reach a broad audience of startup entrepreneurs in Malaysia.

2. **Interviews:**

- **Method:** Semi-structured interviews will be conducted to collect qualitative data. These interviews will provide deeper insights into the experiences and perceptions of entrepreneurs using ChatGPT.
- **Content:** The interview guide will include open-ended questions focused on understanding how ChatGPT is integrated into business processes, its perceived benefits and challenges, and its impact on entrepreneurial outcomes.
- **Procedure:** Interviews will be conducted via video conferencing platforms to ensure convenience and accessibility for participants. Each interview will be recorded (with participant consent) and transcribed for analysis.

**Secondary Data Collection:**

1. **Literature Review:**

- **Sources:** Secondary data will be gathered from academic journals, industry reports, books, and reputable online sources that discuss AI applications in entrepreneurship, natural language processing, and ChatGPT.
- **Purpose:** This data will provide context, support the primary data findings, and help identify gaps in the existing research.

By utilizing both primary and secondary data, this study aims to provide a comprehensive understanding of ChatGPT's role as an entrepreneurial assistant, capturing both empirical evidence and contextual insights. The combination of quantitative surveys and qualitative interviews ensures a balanced approach, providing robust and detailed data for analysis.

## 3.5 Data Analysis Techniques

This section outlines the techniques that will be employed to analyse the data collected through surveys and interviews. The study utilizes both quantitative and qualitative data analysis methods to ensure a comprehensive examination of the research questions and objectives.

**Quantitative Data Analysis:**

The quantitative data collected from the surveys will be analysed using IBM SPSS Statistics software. The following steps will be taken to analyse the survey data:

1. **Descriptive Statistics:**

   Use descriptive statistics to summarize the data and provide an overview of the sample characteristics. This includes measures such as mean, median, mode, standard deviation, and frequency distributions.

**Summaries features of the data for a sample**

Three main types:

I. Measures of central tendency

- Mean (M) - sum of all scores divided by number of scores
- Median (Mdn) - central score when all are ordered
- Mode (Mo) - most commonly occurring score
- In a normal distribution all are equal

II. Measure of dispersion

- Variance- average squared distance of each score from the mean
- Standard deviation (SD)- average distance of each score from the mean
- Percentage

III. Measure of Distribution

I. Skew (Sk)- degree of 'lean' in distribution of scores, away from normal

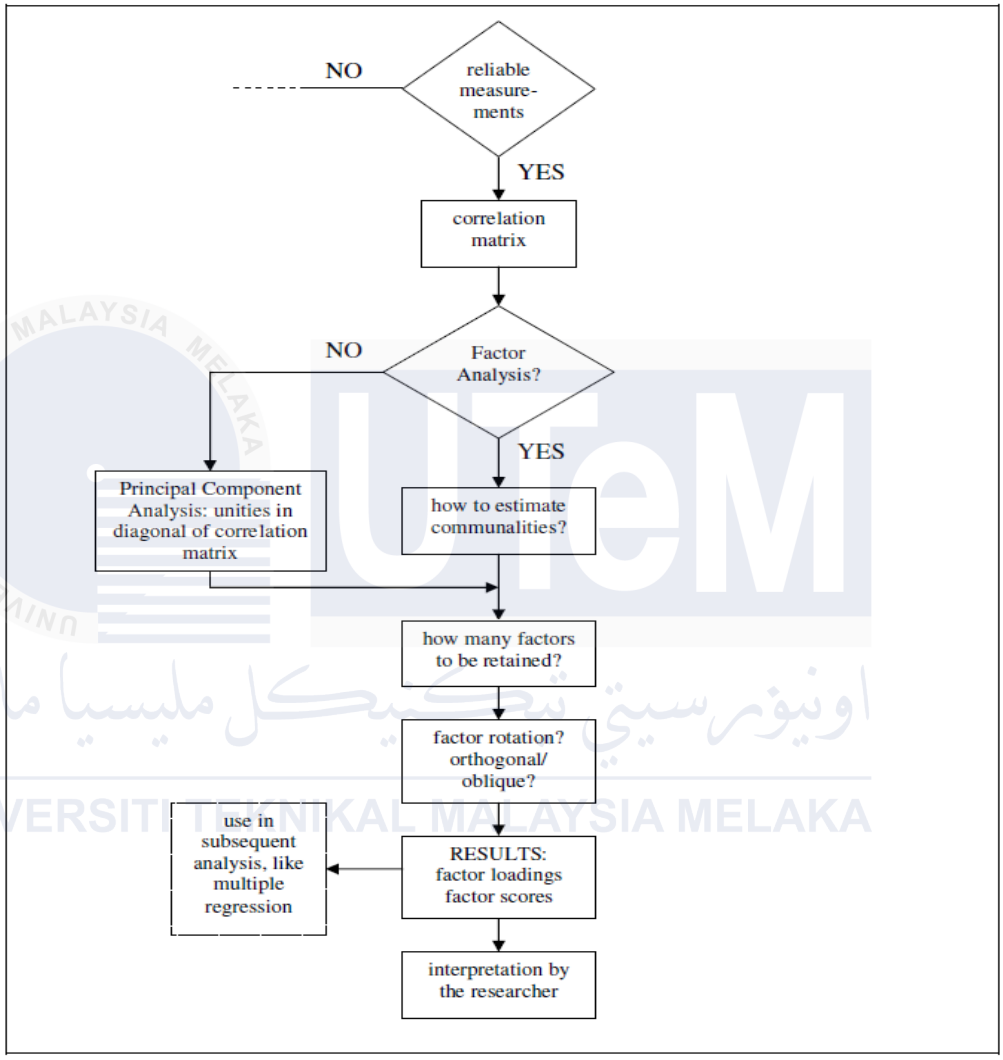
- Negative value = distribution leans to higher end of scale
- Positive values = leans to lower of scale

II. Kurtosis (K) – degree of 'peakedness' or flatness in distribution of scores

- Negative values= distribution flatter-score even spread
- Positive values= more peaked-less spread of score

2. **Exploratory Factor Analysis (EFA):**

Conduct EFA to identify the underlying structure of the data and to determine the key factors that influence the use of ChatGPT by startup entrepreneurs. This technique helps in reducing data dimensions and identifying latent constructs.




- *Figure 1: overview of the steps in a factor analysis. From: Rietveld & Van Hout (1993: 291).*

3. **Pearson's Correlation Analysis:**

Perform Pearson's correlation analysis to determine the strength and direction of the relationships between different variables, such as the use of ChatGPT and various entrepreneurial outcomes.

Pearson correlation coefficient is a test statistic used to determine the statistical relationship or correlation between two continuous variables. It is called the best measure of correlation between variables of interest because it is based on covariance. Therefore, Pearson correlation analysis was used to determine the relationship between independent and dependent variables. The correlation from -1 to 1 indicates that the correlation goes from very weak to very strong. The Pearson Correlation Coefficient, r, is shown in table 3.2 below.

| r | Interpretation |
|---|---|
| 0.81 to 1.00 | Very Strong |
| 0.61 to 0.80 | Strong |
| 0.41 to 0.60 | Moderate |
| 0.21 to 0.40 | Low |
| 0.00 to 0.20 | Very low |

**Table 3.2: Pearson Correlation Coefficient**

4. **Multiple Linear Regression:**

   Use multiple linear regression analysis to assess the impact of ChatGPT on specific entrepreneurial tasks and outcomes. This technique helps in understanding how multiple independent variables collectively influence a dependent variable.



**Qualitative Data Analysis:**

The qualitative data from the semi-structured interviews will be analysed using various qualitative analysis methods to ensure a comprehensive understanding of the research questions. The following methods will be employed:

1. **Content Analysis:**

   Involves systematically analysing the text to identify patterns, themes, and frequencies. This method helps in quantifying qualitative data and identifying common themes across the interviews.

2. **Narrative Analysis:**

Interprets the stories and experiences shared by the entrepreneurs to understand their feelings, behaviours, and motivations. This method focuses on the narrative structure and the meanings behind the stories.

3. **Discourse Analysis:**

   Examines how language is used in the interviews to construct meaning and social realities. This method analyses the context, power dynamics, and social constructs within the text.

4. **Thematic Analysis:**

   Identifies and analyses recurring themes within the interview data. This method involves coding the data, grouping similar codes, and developing overarching themes that capture the key findings.

5. **Grounded Theory Analysis:**

   Involves developing theories grounded in the data itself. This method includes iterative coding and constant comparison to generate a theory that explains the patterns observed in the data.

In summary, the data analysis techniques used in this study will combine the strengths of quantitative and qualitative methods. IBM SPSS Statistics will facilitate robust statistical analysis of the survey data through Exploratory Factor Analysis, Pearson's Correlation Analysis, and Multiple Linear Regression. A range of qualitative analysis methods—including content analysis, narrative analysis, discourse analysis, thematic analysis, and grounded theory analysis—will provide in-depth insights from the interview data. Together, these methods will ensure a thorough and balanced analysis, addressing the research questions and achieving the study objectives.

## 3.6 Validity and Reliability

Ensuring the validity and reliability of a study is critical for producing credible and accurate results. These concepts are fundamental to the evaluation of any research process, particularly in quantitative research, where the consistency and accuracy of measurements are crucial.

### 3.6.1 Validity

**Validity** refers to the extent to which a measuring instrument accurately measures what it is intended to measure (Sürücü & Maslaki, 2020). It ensures that the data collected is appropriate and accurately reflects the concept being studied. There are several types of validity to consider:

- **Content Validity**: Ensures that the measurement instrument covers all aspects of the concept being measured.
- **Construct Validity**: Confirms that the instrument truly measures the theoretical construct it intends to measure.
- **Criterion-related Validity**: Assesses how well one measure predicts an outcome based on another measure.



In this study, the use of validated measurement instruments ensures the accuracy of the results. Internal validity is essential as it refers to the degree to which the observed effects can be attributed to the independent variable rather than other factors. This is achieved by controlling extraneous variables, ensuring that the influence on the dependent variable is solely due to the independent variable.

### 3.6.2 Reliability

**Reliability** refers to the consistency and stability of the measurement. A measurement is considered reliable if it produces consistent results when repeated under the same conditions (Middleton, 2022). Several methods can be used to assess reliability:

- **Test-retest Reliability**: Measures the consistency of results when the same test is administered at different points in time.
- **Inter-rater Reliability**: Assesses the degree of agreement between different raters or observers.
- **Internal Consistency**: Evaluates the consistency of results across items within a test.

In this study, The Cronbach's Alpha method is used by the researcher in this study to assess the research's reliability. The Alpha Coefficient ranges between 0 and 1. To indicate study reliability, the result must be greater than 0.6. If the result is less than 0.6, there is an issue with the data. The Cronbach's Alpha coefficient values are shown in the table below. The scale of Cronbach's alpha is shown in the table below.



| Cronbach's Alpha Coefficient | Internal Consistency |
|---|---|
| $\alpha \geq 0.9$ | Excellent |
| $0.7 \leq \alpha < 0.9$ | Good |
| $0.6 \leq \alpha < 0.7$ | Acceptable |
| $0.5 \leq \alpha < 0.6$ | Poor |
| $\alpha < 0.5$ | Unacceptable |

**Table 3.3: Cronbach's Alpha Coefficient**

## 3.7 Research Framework

The research framework provides a structured approach to understanding the relationship between the key variables in the study. This section outlines the conceptual and operational framework that guides the investigation of ChatGPT's role as a digital assistant for startup entrepreneurs.

### 3.7.1 Conceptual Framework

The conceptual framework illustrates the key constructs and their hypothesized relationships, forming the basis for the research hypotheses. It serves as a visual representation of the theoretical underpinnings of the study, highlighting the pathways through which ChatGPT influences entrepreneurial outcomes.

**Key Constructs**:

1. **ChatGPT Usage**: This construct encompasses various aspects of how entrepreneurs use ChatGPT, including frequency, duration, and types of tasks performed.
2. **Entrepreneurial Outcomes**: This includes measures such as operational efficiency, customer engagement, innovation, and overall business performance.
3. **Entrepreneurial Challenges**: Common pain points faced by entrepreneurs in their daily operations.

**Hypothesized Relationships**:

- ChatGPT Usage → Entrepreneurial Outcomes: This relationship explores how the use of ChatGPT impacts various entrepreneurial outcomes.
- ChatGPT Usage → Entrepreneurial Challenges: This examines how ChatGPT helps in addressing common challenges faced by entrepreneurs.
- Entrepreneurial Challenges → Entrepreneurial Outcomes: This relationship investigates how overcoming challenges influences overall business performance.

### 3.7.2 Operational Framework

The operational framework translates the conceptual framework into specific, measurable components that guide the data collection and analysis process. It defines the variables, measurement instruments, and analytical methods used to test the hypothesized relationships.

**Variables and Measures**:

1. **Independent Variables**:

2.6 Frequency of ChatGPT Usage (measured in hours per week)
2.7 Duration of ChatGPT Usage (measured in months)
2.8 Types of Tasks Performed with ChatGPT (categorized as administrative, strategic, customer support, etc.)

2. **Dependent Variables**:

- Operational Efficiency (measured using a Likert scale survey on perceived efficiency improvements)
- Customer Engagement (measured by customer satisfaction surveys and engagement metrics)
- Innovation (measured by the number of new products/services introduced and process improvements)
- Business Performance (measured by revenue growth, market expansion, and profitability)

3. **Control Variables**:

- Entrepreneur's Experience (measured in years)
- Business Size (measured by the number of employees)
- Industry Sector (categorized by industry type)

**Analytical Methods**:

- **Descriptive Statistics**: To summarize the demographic characteristics and key variables.
- **Exploratory Factor Analysis (EFA)**: To identify underlying dimensions of ChatGPT usage.
- **Cronbach's Alpha**: To assess the reliability of measurement instruments.
- **Pearson's Correlation Analysis**: To determine the relationships between ChatGPT usage and entrepreneurial outcomes.
- **Multiple Linear Regression**: To assess the impact of ChatGPT usage on entrepreneurial outcomes while controlling for other variables.

By clearly defining the research framework, this study aims to systematically investigate the role of ChatGPT as a digital assistant, providing valuable insights into its effectiveness and utility for startup entrepreneurs.



## 3.8 Summary

In this chapter, we have outlined the research methodology employed to investigate the role of ChatGPT as a digital assistant for startup entrepreneurs. The methodology encompasses the research design, population and sample, data collection methods, data analysis techniques, and the approach to ensuring validity and reliability.

The **research design** is a mixed-method approach, integrating both quantitative and qualitative methods to provide a comprehensive understanding of the research problem. The **population and sample** include geographically diverse

entrepreneurs from Malaysia, ensuring a broad representation of the entrepreneurial landscape.

For **data collection**, both primary and secondary data are utilized. Primary data is gathered through Google Forms surveys and interviews, capturing firsthand insights from entrepreneurs. Secondary data is sourced from existing literature and databases, providing contextual background and supporting information.

**Data analysis** involves several quantitative techniques using IBM SPSS Statistics software. Descriptive statistics summarize the key characteristics of the data. Pearson's correlation analysis examines the relationships between variables. Multiple linear regression assesses the impact of ChatGPT usage on entrepreneurial outcomes, while exploratory factor analysis identifies underlying dimensions of ChatGPT usage. Qualitative data analysis methods such as content analysis and thematic analysis are employed to interpret interview data.

**Validity and reliability** are critical to the credibility of the study. Validity ensures that the research measures what it intends to measure, while reliability ensures consistent results across different measurements. The study uses Cronbach's Alpha to assess the reliability of the instruments, ensuring that the data collected is both accurate and consistent.



The **research framework** provides a structured approach to understanding the relationships between the key variables. The conceptual framework illustrates the hypothesized relationships between ChatGPT usage, entrepreneurial challenges, and entrepreneurial outcomes. The operational framework translates these relationships into measurable components, guiding data collection and analysis.

In summary, this chapter lays the foundation for the empirical investigation of ChatGPT's role as a digital assistant for startup entrepreneurs. The comprehensive research methodology ensures that the study is robust, reliable, and capable of providing valuable insights into the potential benefits and challenges of integrating ChatGPT into entrepreneurial activities. The next chapter will delve into the data analysis and interpretation of the results, shedding light on the practical implications of the findings.

# CHAPTER 4

# RESULTS AND DISCUSSIONS

## 4.1 Introduction

This chapter details the analysis of data derived from both the distributed questionnaire and semi-structured interviews, targeting startup entrepreneurs. Utilizing SPSS version 27 for quantitative analysis and thematic analysis for qualitative insights, the study explores demographic profiles, assesses survey reliability, and employs descriptive and regression analyses to examine relationships between various constructs. Additionally, qualitative data from interviews enhance the understanding of the contextual applications and perceptions of ChatGPT in entrepreneurial settings. Together, these methods provide a comprehensive view of how AI tools like ChatGPT are perceived and used within the entrepreneurial landscape.



# Quantitative:

## 4.2 Descriptive Analysis

This section provides a detailed descriptive analysis of the survey data collected from 324 startup entrepreneurs using Google Forms. The analysis covers demographic information, business characteristics, and respondents' familiarity and usage of AI tools like ChatGPT. The purpose is to establish a baseline understanding of the survey population and their initial perspectives towards AI in entrepreneurship. as shown in Table 4.1.

| Characteristic | Category | Frequency | Percentage (%) |
|---|---|---|---|
| Age Group | 18-25 | 114 | 35.2% |
| | 26-30 | 151 | 46.6% |
| | 31 and above | 59 | 18.2% |
| Gender | Male | 145 | 44.8% |
| | Female | 179 | 55.2% |
| Education Level | Bachelor's Degree | 109 | 33.6% |
| | High School Diploma or below | 111 | 34.3% |
| | Master's Degree and above | 104 | 32.1% |
| Industry | Retail | 35 | 10.8% |
| | Service | 85 | 26.2% |
| | Technology | 65 | 20.1% |
| | Manufacturing | 96 | 29.6% |
| | Other | 43 | 13.3% |
| Size of Business | Micro (<10 employees) | 50 | 15.4% |
| | Small (10-50 employees) | 97 | 29.9% |
| | Medium (51-200 employees) | 130 | 40.1% |
| | Large (>200 employees) | 47 | 14.5% |
| Years in Operation | Less than 1 year | 97 | 29.9% |
| | 1-5 years | 140 | 43.2% |
| | 6-10 years | 60 | 18.5% |
| | More than 10 years | 27 | 8.3% |
| Familiarity with AI | Yes | 267 | 82.4% |
| | No | 57 | 17.6% |
| Frequency of AI Usage | Daily | 27 | 8.3% |
| | Weekly | 91 | 28.1% |
| | Monthly | 44 | 13.6% |
| | Rarely | 82 | 25.3% |
| | Never | 80 | 24.7% |

**Table 4.1: Demographic and Business Characteristics of Respondents**

### 4.2.1 Age

**Age**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 18-25 | 114 | 35.2 | 35.2 | 35.2 |
| | 26-30 | 151 | 46.6 | 46.6 | 81.8 |
| | 31 and above | 59 | 18.2 | 18.2 | 100.0 |
| | Total | 324 | 100.0 | 100.0 | |

**Table 4.2: Age of Respondents**

(Source: Data Analysis of SPSS)

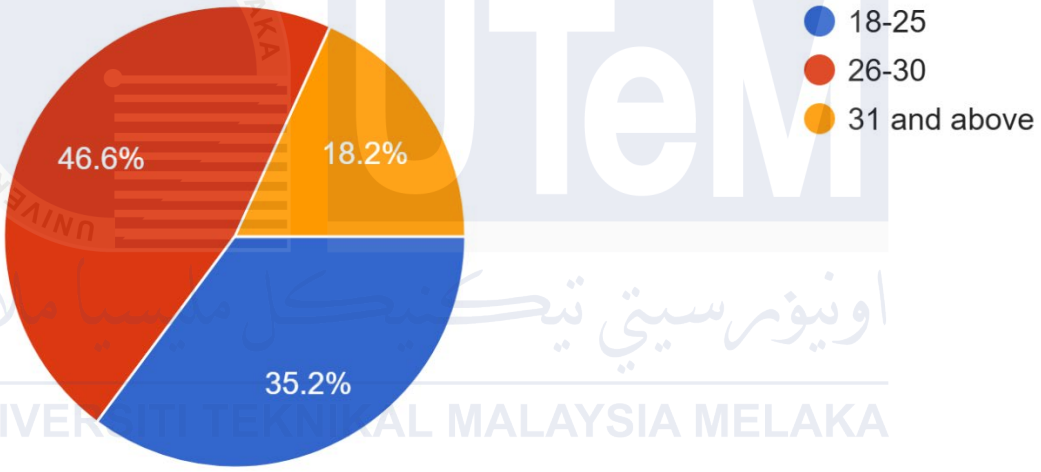





**Figure 4.1: Age of Respondents**

(Source: Data Analysis of SPSS)

The age distribution of respondents shows a notable concentration in the 26-30 age group, accounting for 46.6% of the total. This age group's strong representation may reflect their keen interest in the survey's topics, likely driven by their life stage, characterized by significant professional and personal development. In my view, this age group is pivotal as they are at a prime age for embracing new technologies and innovations that can enhance their business ventures.

The data suggests that younger entrepreneurs, especially those under 31, are more open to adopting technologies like AI, which aligns with their greater familiarity and comfort with digital tools. The chart in Figure 4.1 visually emphasizes this trend,

highlighting a demographic likely to pioneer digital transformation in business. In essence, the strong participation of the 26-30 age group could indicate a broader inclination towards new technologies, suggesting that they are not only numerous but also deeply engaged with the survey's focus areas.

### 4.2.2 Gender

**Gender**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Female | 179 | 55.2 | 55.2 | 55.2 |
| | Male | 145 | 44.8 | 44.8 | 100.0 |
| | Total | 324 | 100.0 | 100.0 | |

**Table 4.3: Gender of Respondents**

(Source: Data Analysis of SPSS)

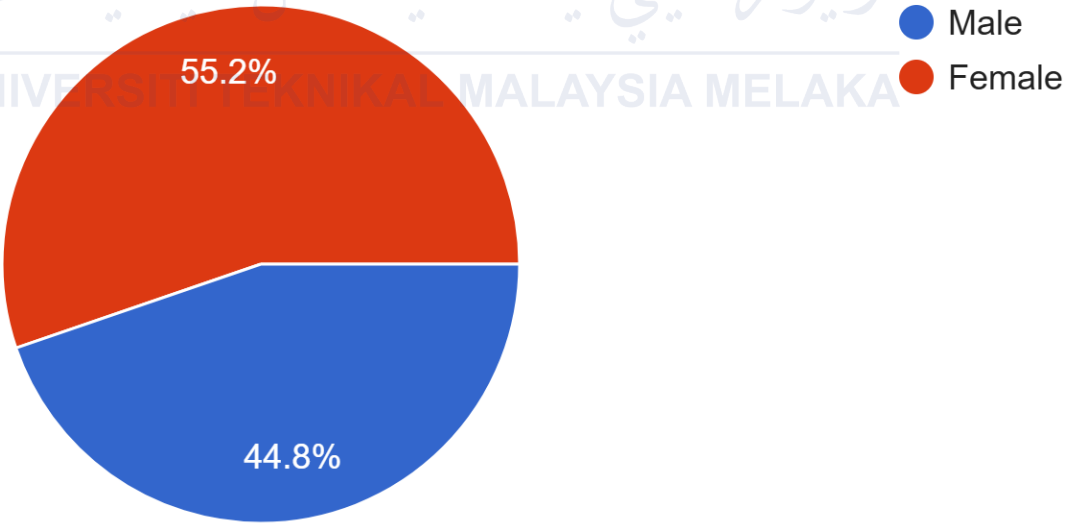



**Figure 4.2: Gender of Respondents**

(Source: Data Analysis of SPSS)

The gender distribution of respondents shows a slightly higher participation from females, representing 55.2%, compared to males at 44.8%. This balance in

gender representation is encouraging as it reflects a diverse range of perspectives, which is crucial for the comprehensive analysis of any topic.

From my perspective, the higher female participation might indicate a strong interest or a greater stake in the subject matter of the survey. This could suggest that females are actively engaging with and possibly driving discussions in areas covered by the survey. It's essential to consider these dynamics, as they could shape the interpretations and outcomes of the study.

The visual in Figure 4.2 clearly depicts this distribution, highlighting the active involvement of both genders in the survey, which could enrich the findings and enhance the relevance of the results to different demographic groups. This balanced gender participation underscores the importance of ensuring diverse input in research to capture a wide array of insights and experiences.



### 4.2.3 Education Level

**EducationLevel**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Bachelor's Degree | 109 | 33.6 | 33.6 | 33.6 |
| | High School Diploma or below | 111 | 34.3 | 34.3 | 67.9 |
| | Master's Degree and above | 104 | 32.1 | 32.1 | 100.0 |
| | Total | 324 | 100.0 | 100.0 | |

**Table 4.4: Education Level of Respondents**

(Source: Data Analysis of SPSS)

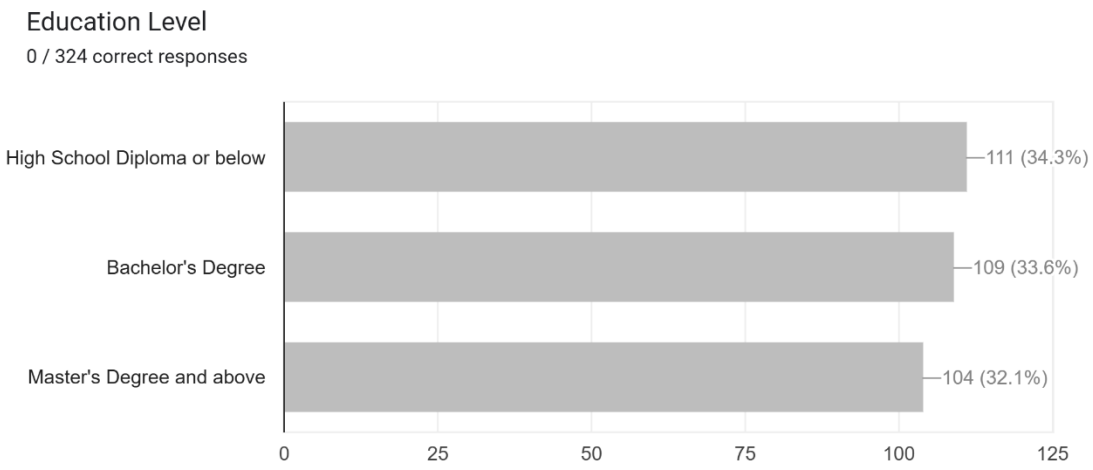



**Figure 4.3: Education Level of Respondents**

(Source: Data Analysis of SPSS)

The educational background of respondents is well-distributed among three key categories: Bachelor's Degree holders, high school diploma or below, and those with a master's degree and above, nearly equally divided among the three. This diversity in educational attainment could significantly affect the perspectives and interpretations drawn from the survey data.

In my opinion, the relatively equal distribution across different educational levels suggests a broad interest in the survey's subject matter, transcending educational boundaries. It's intriguing to note that the level of formal education does not heavily skew the participation rates, which could imply a universal relevance or appeal of the survey topics across various educational backgrounds.

The graph in Figure 4.3 visually reinforces this balanced educational participation, which is crucial for ensuring that the survey results are reflective of varied intellectual and academic insights. This balanced educational representation enhances the reliability of the survey by incorporating a wide spectrum of educational experiences and knowledge bases.

Overall, the educational diversity among the respondents highlights the inclusive nature of the survey and supports the potential for a comprehensive understanding of the surveyed topic from multiple educational viewpoints.

### 4.2.4 Industry

**Industry**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Manufacturing | 96 | 29.6 | 29.6 | 29.6 |
| | Other | 43 | 13.3 | 13.3 | 42.9 |
| | Retail | 35 | 10.8 | 10.8 | 53.7 |
| | Service | 85 | 26.2 | 26.2 | 79.9 |
| | Technology | 65 | 20.1 | 20.1 | 100.0 |
| | Total | 324 | 100.0 | 100.0 | |

**Table 4.5: Industry of Respondents**

(Source: Data Analysis of SPSS)

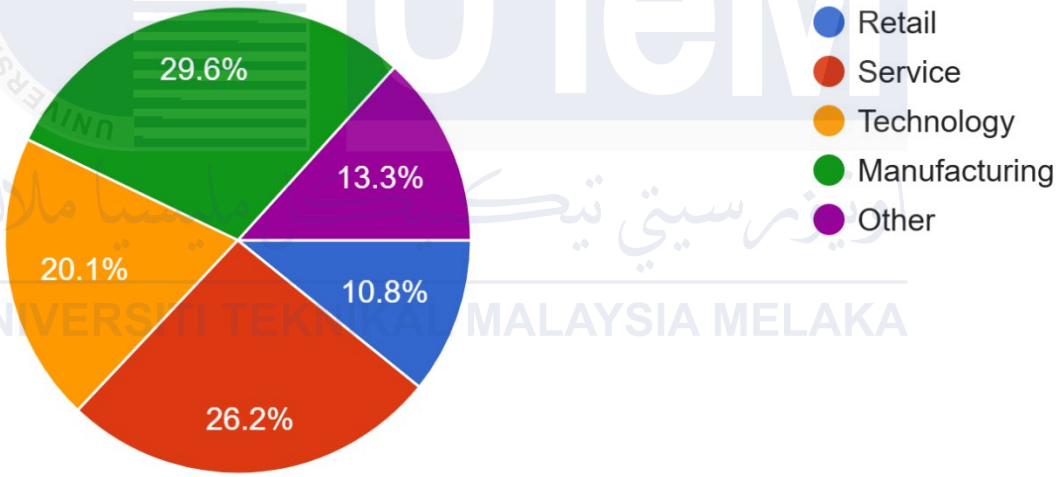



**Figure 4.4: Industry Level of Respondents**

(Source: Data Analysis of SPSS)

The distribution of respondents across various industries presents a diverse industrial background with manufacturing leading at 29.6%, followed closely by the service sector at 26.2%, and technology at 20.1%. The retail industry captures 10.8% while other industries combine for 13.3%.

From a personal standpoint, the strong showing from the manufacturing sector could reflect the sector's current dynamism and possibly its vulnerability or receptiveness to the topics addressed in the survey, such as technological integration or economic shifts. The significant representation from the service and technology

sectors also suggests these areas are equally engaged, likely due to their direct interaction with technological advancements and customer interactions.

Figure 4.4 illustrates this spread effectively, showing a balanced yet distinct participation from core economic sectors. This variety is beneficial as it ensures the survey captures a wide range of industrial perspectives, potentially enriching the study's conclusions with varied sector-specific insights.

In my view, the data implies a robust interest from sectors that are pivotal to economic growth and technological adoption, highlighting their potential responsiveness to new trends and their impacts. This suggests that findings from this survey could be particularly relevant for policy-making and strategic planning within these dominant industries.

### 4.2.5 Size of Business

**SizeofBusiness**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Large (>200 employees) | 47 | 14.5 | 14.5 | 14.5 |
| | Medium (51-200 employees) | 130 | 40.1 | 40.1 | 54.6 |
| | Micro (<10 employees) | 50 | 15.4 | 15.4 | 70.1 |
| | Small (10-50 employees) | 97 | 29.9 | 29.9 | 100.0 |
| | Total | 324 | 100.0 | 100.0 | |

**Table 4.6: Size of Business of Respondents**

(Source: Data Analysis of SPSS)

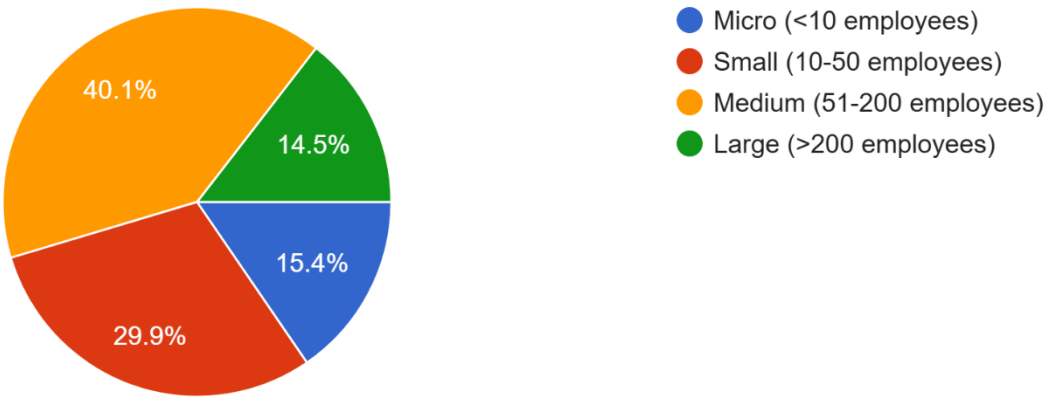


**Figure 4.5: Size of Business of Respondents**

(Source: Data Analysis of SPSS)

The size of businesses represented in the survey varies, with medium-sized businesses (51-200 employees) comprising the largest segment at 40.1%. Small businesses (10-50 employees) follow at 29.9%, micro businesses (less than 10 employees) at 15.4%, and large businesses (over 200 employees) at 14.5%.

From my perspective, the predominance of medium-sized businesses participating in the survey suggests that these businesses are possibly more attuned or responsive to the implications of the survey's focus areas, such as market changes or regulatory shifts. This interest may stem from their need to stay competitive and adaptable in a changing economic environment.

The significant engagement from small and micro businesses also indicates a keen interest in gaining insights that could support their growth and sustainability. In contrast, the lower participation rate of large businesses might reflect a different set of priorities or established strategies that make the survey's topics less pressing for them. Figure 4.5 clearly shows the distribution, emphasizing the engagement levels across different business sizes. This variety in business size representation is crucial as it provides a broad perspective, ensuring the survey results encompass insights applicable to various stages of business growth.

In essence, the data highlights a strong and diverse interest from businesses of varying sizes, each bringing unique perspectives that could enhance the depth and applicability of the study's findings to the broader business community.

### 4.2.6 Years in Operation

**YearsinOperation**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 1-5 years | 140 | 43.2 | 43.2 | 43.2 |
| | 6-10 years | 60 | 18.5 | 18.5 | 61.7 |
| | Less than 1 year | 97 | 29.9 | 29.9 | 91.7 |
| | More than 10 years | 27 | 8.3 | 8.3 | 100.0 |
| | Total | 324 | 100.0 | 100.0 | |

**Table 4.7: Years in Operation of Respondents**

(Source: Data Analysis of SPSS)

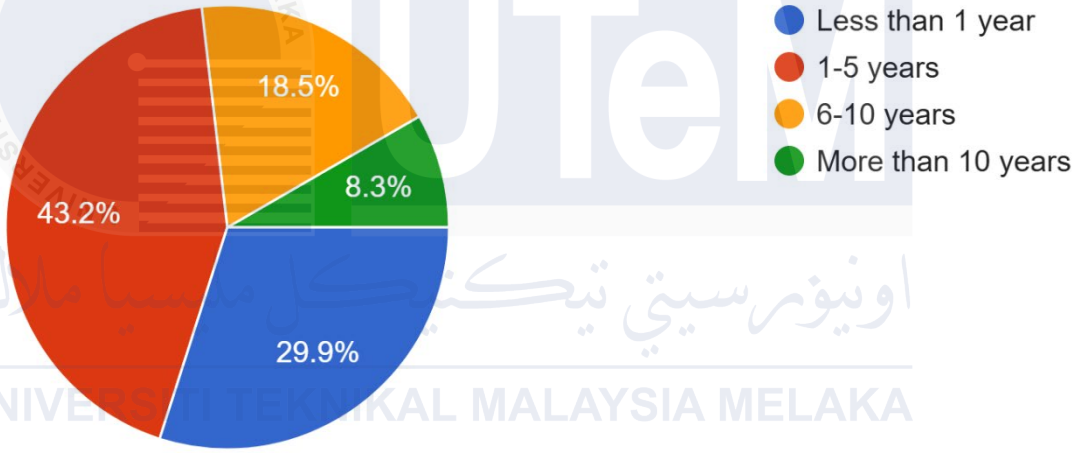





**Figure 4.6: Years in Operation of Respondents**

(Source: Data Analysis of SPSS)

The data on the years businesses have been in operation indicates that most respondents are relatively new businesses, with 43.2% operating between 1 to 5 years, and 29.9% for less than one year. Businesses operating for 6-10 years represent 18.5%, while those over ten years account for 8.3%.

In my view, the high percentage of businesses that have been operating for between 1 to 5 years might reflect a wave of new entrepreneurial ventures, potentially spurred by recent economic or technological trends. This younger demographic of businesses suggests a vibrant entrepreneurial scene that is possibly more adaptive to innovative practices and changes in the market.

The significant presence of businesses operating for less than a year highlights the continuous emergence of new enterprises, which could be driven by increasing opportunities in niche markets or advancements in technology that lower the barrier to entry. Figure 4.6 visually presents these insights, showing a substantial segment of newer businesses, which may have different needs and perspectives compared to more established companies. This distribution is essential for understanding the current business landscape and anticipating future trends in business growth and development.

Overall, the data suggests a dynamic business environment with a considerable influx of new enterprises that could be more open to adopting new technologies and methods, influencing the broader market landscape.



### 4.2.7 Familiar with AI

**AreyoufamiliarwithAItoolslikeChatGPT**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | No | 57 | 17.6 | 17.6 | 17.6 |
| | Yes | 267 | 82.4 | 82.4 | 100.0 |
| | Total | 324 | 100.0 | 100.0 | |

**Table 4.8: Familiar with AI of Respondents**

(Source: Data Analysis of SPSS)

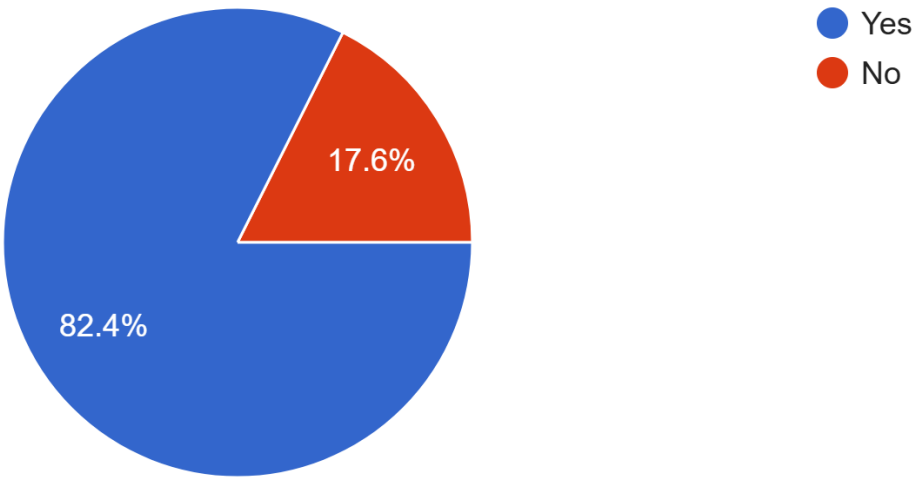



**Figure 4.7: Familiar with AI of Respondents**

(Source: Data Analysis of SPSS)

The survey results show a high level of familiarity with AI among respondents, with 82.4% indicating they are aware of AI tools like ChatGPT. This suggests a significant penetration of AI knowledge and its applications within the surveyed group.

Personally, I find this data very promising as it indicates that most respondents are not only aware of but potentially also engaging with AI technologies. This high level of familiarity may reflect a general trend towards digital literacy and an openness to embracing new technologies, which is crucial for the integration of advanced tools in various sectors.

Figure 4.7 clearly depicts this trend, showing the overwhelming majority who are familiar with AI. This widespread familiarity is likely to influence how businesses adopt and integrate AI solutions, shaping future strategies and competitive dynamics in the marketplace.

In summary, the high familiarity with AI among the respondents could signal a readiness to further explore and integrate these technologies, possibly driving innovation and efficiency in their operations and offering a competitive edge in their respective industries.

### 4.2.8 Frequency of AI Usage

**HowfrequentlydoyouuseAItoolsinyourbusinessoperations_B**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Daily | 27 | 8.3 | 8.3 | 8.3 |
| | Monthly | 91 | 28.1 | 28.1 | 36.4 |
| | Never | 44 | 13.6 | 13.6 | 50.0 |
| | Rarely | 82 | 25.3 | 25.3 | 75.3 |
| | Weekly | 80 | 24.7 | 24.7 | 100.0 |
| | Total | 324 | 100.0 | 100.0 | |

**Table 4.9: Frequency of AI Usage of Respondents**

(Source: Data Analysis of SPSS)

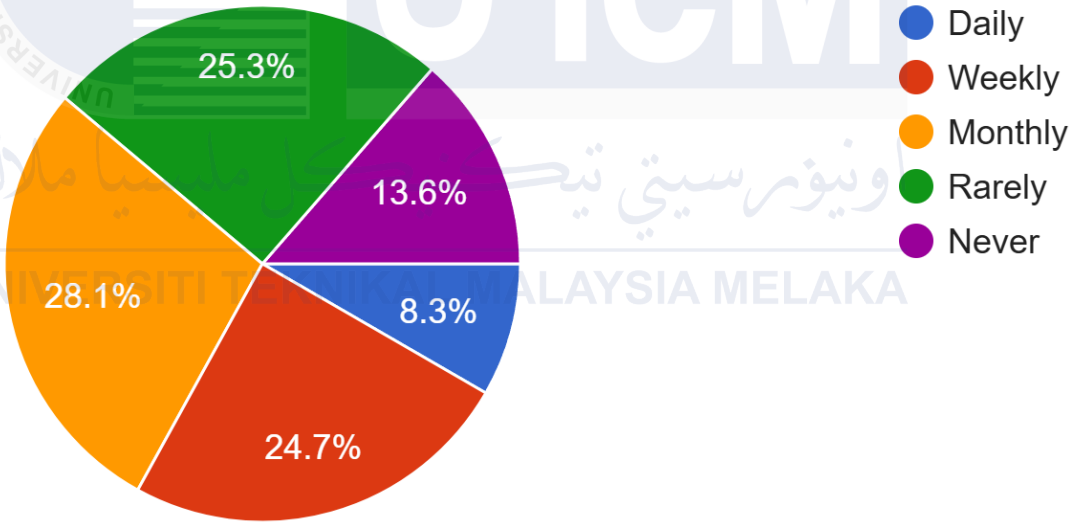



**Figure 4.8: Frequency of AI Usage of Respondents**

(Source: Data Analysis of SPSS)

The survey reveals diverse frequencies of AI usage among respondents, with the majority reporting usage monthly (28.1%), followed by weekly (24.7%), rarely (25.3%), and daily (8.3%). Those who never use AI account for 13.6%.

From my personal observation, the varying frequency of AI usage could reflect different levels of adoption and integration of AI technologies across various business operations. The monthly and weekly usage patterns might indicate that while

businesses are engaging with AI, they may do so more on a needs-based approach rather than integrating AI deeply into their daily operations.

The relatively low daily usage suggests that while AI is recognized and utilized, it may not yet be central to the daily operational strategies of most businesses. Conversely, the considerable percentage of respondents who use AI rarely or never could indicate sectors or businesses where AI has not yet been perceived as beneficial or feasible.

Figure 4.8 visually underscores this distribution, highlighting that while a significant portion of the business community is engaging with AI to some extent, there is still room for growth in terms of more frequent and widespread use.

This pattern suggests that while familiarity with AI is high, as indicated in the previous section, the actual implementation into regular business practices varies significantly, possibly reflecting a gap between awareness and practical application. This insight could be crucial for developing targeted strategies to increase AI adoption and optimize its benefits across different business sectors.

### 4.3 Exploratory Factor Analysis (EFA)

The Exploratory Factor Analysis was conducted using Principal Component Analysis (PCA) with a Varimax rotation to identify underlying factors in the dataset that relate to the utilization and perceptions of AI technologies among entrepreneurs. The analysis included four key variables: frequency of AI tool usage, perceived usefulness of AI in business operations, belief in the potential benefits of AI, and overall satisfaction with AI tools.

**Communalities**

| | Initial | Extraction |
|---|---|---|
| FreqUseAI_num | 1.000 | .707 |
| HowdoyouperceivetheusefulnessofChatGPTinyourbusinesso_B | 1.000 | .700 |
| TowhatextentdoyoubelieveChatGPTorsimilarAItoolscould_B | 1.000 | .430 |
| OverallhowwouldyourateyourexperiencewithChatGPTorothe_B | 1.000 | .735 |

Extraction Method: Principal Component Analysis.



**Table 5: Communalities**

(Source: Data Analysis of SPSS)

**Communalities**

The communalities before and after extraction, as shown in the table, indicate how much of the variance in the original variables is accounted for by the extracted factors. For instance:

- **FreqUseAI_num**: A high communality of .707 suggests that nearly 71% of the variance in this variable is explained by the underlying factors, indicating its strong correlation with other variables in the factor model.
- **HowdoyouperceivetheusefulnessofChatGPTinyourbusiness_B**: This variable has a communality of .700, indicating that 70% of its variance is explained by the factors extracted.

- **TowhatextentdoyoubelieveChatGPTorsimilarAItoolscould_B**: The lower communality of .430 suggests that belief in the utility of AI tools like ChatGPT is less closely related to the other variables in the factor analysis.
- **OverallhowwouldyourateyourexperiencewithChatGPTorthe_B**: A communality of .735 means that 73.5% of the variance in overall satisfaction with ChatGPT is explained by the extracted factors.

**Conclusion:**

The communalities for each variable provided insights into how much of the variance in each is explained by the extracted factors. Variables such as frequency of use, perceived usefulness, and overall satisfaction showed high communalities, indicating that these areas are well-represented by the extracted components. However, the beliefs regarding the utility of AI tools like ChatGPT showed a relatively lower communality, suggesting that this aspect may be influenced by factors not captured in the current model.



**Total Variance Explained**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 2.573 | 64.313 | 64.313 | 2.573 | 64.313 | 64.313 |
| 2 | .730 | 18.239 | 82.552 | | | |
| 3 | .403 | 10.077 | 92.629 | | | |
| 4 | .295 | 7.371 | 100.000 | | | |

Extraction Method: Principal Component Analysis.

**Table 5.1: Total Variance Explained**

(Source: Data Analysis of SPSS)

**Total Variance Explained**

This table outlines the results of the Principal Component Analysis, showing the eigenvalues and the percentage of variance explained by each component, along with cumulative percentages. The analysis identifies four components:

- **Component 1**: Accounts for the majority of variance at 64.313%, indicating a strong factor that captures a significant portion of the information in the dataset.
- **Component 2**: Adds 18.239% to the explained variance, totalling 82.552% when combined with Component 1, highlighting its relevance in the factor structure.
- **Component 3**: Contributes an additional 10.077% to the variance, totalling 92.629% cumulatively, which supports the presence of a third significant factor in explaining the behaviours or opinions surveyed.
- **Component 4**: The smallest contributing factor, explaining 7.371% of the variance, brings the cumulative total to 100%, indicating that all four components together capture the entirety of variance in the observed variables.

**Conclusion:**

The PCA revealed that the first two components explain a significant portion of the variance (82.552% cumulatively). This suggests that these components capture the most crucial aspects influencing entrepreneurs' engagement with AI tools. The first component is highly influential, explaining 64.313% of the variance alone, likely representing a general attitude or overarching factor related to AI usage and perceptions.

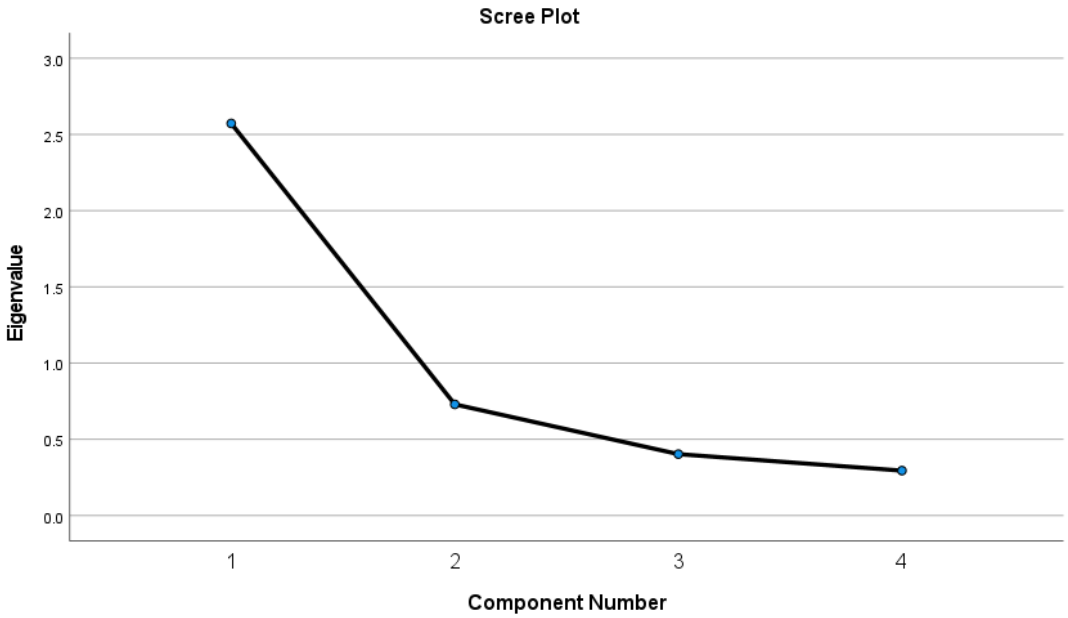


**Figure 4.9: Scree Plot**

(Source: Data Analysis of SPSS)

**Scree Plot Analysis**: The scree plot visualizes the eigenvalues associated with each component extracted during the PCA, aiding in determining the number of components to retain for further analysis. The plot shows a distinct 'elbow' after the first component, which justifies the decision to focus primarily on the first few components.

**Interpretation**:

- **Component 1** has an eigenvalue significantly higher than the others, exceeding 2.5, which captures the most substantial part of the variance within the dataset.
- **Component 2** has an eigenvalue above 0.7, indicating it still contributes importantly to explaining the variance.
- **Components 3 and 4** have smaller eigenvalues (around 0.4 and 0.3 respectively), showing diminishing returns in terms of additional variance explained.

**Conclusion**: The scree plot indicates that a two-component solution could potentially suffice for most practical purposes, simplifying the model while retaining the ability to interpret the major underlying patterns in the data. This approach is consistent with the goal of achieving a parsimonious model that effectively summarizes the data with the least complexity.

**In conclusion**, the EFA has laid a robust foundation for understanding the dimensions that influence the use and perception of AI tools in entrepreneurial activities. The analysis not only simplifies the complex interrelations among various observed variables but also highlights the primary and secondary factors entrepreneurs consider when integrating AI technologies into their operations. Future research could build on these findings by exploring additional variables or by conducting confirmatory factor analysis (CFA) to further validate the factor structure revealed in this study.

### 4.4 Pearson Correlation Analysis

The correlation matrix shows the relationships between different variables regarding the perception and usage of AI tools. Below are the interpretations for each significant correlation found in your analysis:

**Correlations**

| | | Howdoyouperceivetheusefulnessof ChatGPTinyourbusinesso_B | Towhatextentdoyoubelieve ChatGPTorsimilarAltoolscould_B | Overallhowwouldyourateyourexperiencewithchatgptorothe_B | FreqUseAI_num |
|---|---|---|---|---|---|
| Howdoyouperceivetheusefulnessof ChatGPTinyourbusinesso_B | Pearson Correlation | 1 | .353** | .702** | .574** |
| | Sig. (2-tailed) | | <.001 | <.001 | <.001 |
| | N | 324 | 324 | 324 | 324 |
| Towhatextentdoyoubelieve ChatGPTorsimilarAltoolscould_B | Pearson Correlation | .353** | 1 | .379** | .488** |
| | Sig. (2-tailed) | <.001 | | <.001 | <.001 |
| | N | 324 | 324 | 324 | 324 |
| Overallhowwouldyourateyourexperiencewithchatgptorothe_B | Pearson Correlation | .702** | .379** | 1 | .609** |
| | Sig. (2-tailed) | <.001 | <.001 | | <.001 |
| | N | 324 | 324 | 324 | 324 |
| FreqUseAI_num | Pearson Correlation | .574** | .488** | .609** | 1 |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | |
| | N | 324 | 324 | 324 | 324 |

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

**Table 5.2: Pearson Correlation Analysis**

(Source: Data Analysis of SPSS)

**Key Findings:**

- **Usefulness and Overall Experience**: There is a strong positive correlation (.702) between perceptions of usefulness and overall satisfaction with ChatGPT, suggesting that higher perceived usefulness is associated with increased satisfaction.
- **Frequency of Use and Overall Experience**: A significant positive correlation (.609) between the frequency of AI use and overall experience indicates that more frequent use is linked to better user experiences.
- **Belief in Benefits and Usefulness**: A moderate positive correlation (.353) between the belief in the potential benefits of similar AI tools and the perceived usefulness of ChatGPT suggests that positive beliefs about AI's

capabilities are moderately associated with perceptions of its usefulness in business operations.

**Conclusion:**

The Pearson Correlation Analysis confirms that positive perceptions of AI tools, frequent usage, and belief in their potential benefits are closely linked to higher satisfaction among business users. These insights can inform strategies to enhance user engagement and satisfaction with AI technologies in business settings, emphasizing the importance of demonstrating real-world utility and fostering positive attitudes towards these tools.

## 4.5 Multiple Linear Regression

In this section, the objective of this Multiple Linear Regression analysis was to investigate the impact of various predictors on the overall user experience with ChatGPT among business users. The model included predictors such as the frequency of AI use, perceived usefulness of ChatGPT, and belief in the potential benefits of similar AI tools. insights into areas where business operations could be enhanced through strategic AI tool integration.



### Model Summary

The regression model indicated a good fit with an R2R^2R2 of 0.559, meaning that approximately 55.9% of the variance in overall user experience is explained by the model. The adjusted R2R^2R2 value of 0.555 suggests that the model is generally robust with respect to the number of predictors included.

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .748[a] | .559 | .555 | .522 | .559 | 135.126 | 3 | 320 | <.001 |

a. Predictors: (Constant), TowhatextentdoyoubelieveChatGPTorsimilarAltoolscould_B, HowdoyouperceivetheusefulnessofChatGPTinyourbusinesso_B, FreqUseAI_num

**Table 5.3: Model Summary**

(Source: Data Analysis of SPSS)

**Change Statistics** reveal a significant FFF change (135.126) with a significance of p<.001p < .001p<.001, confirming the overall model is statistically significant.

### ANOVA Table

The ANOVA table supports the model's significance, indicating that the regression model predicts the dependent variable effectively.

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 110.299 | 3 | 36.766 | 135.126 | <.001[b] |
| | Residual | 87.069 | 320 | .272 | | |
| | Total | 197.367 | 323 | | | |

a. Dependent Variable: OverallhowwouldyourateyourexperiencewithChatGPTorothe_B

b. Predictors: (Constant), TowhatextentdoyoubelieveChatGPTorsimilarAltoolscould_B, HowdoyouperceivetheusefulnessofChatGPTinyourbusinesso_B, FreqUseAI_num

**Table 5.4: ANOVA**

(Source: Data Analysis of SPSS)

### Coefficients Table

The coefficients table provides detailed insights into the contribution of each predictor:

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | .444 | .198 | | 2.247 | .025 | | |
| | FreqUseAI_num | .293 | .051 | .283 | 5.782 | <.001 | .578 | 1.731 |
| | HowdoyouperceivetheusefulnessofChatGPTinyourbusinesso_B | .537 | .047 | .520 | 11.403 | <.001 | .664 | 1.506 |
| | TowhatextentdoyoubelieveChatGPTorsimilarAltoolscould_B | .061 | .045 | .058 | 1.353 | .177 | .754 | 1.327 |

a. Dependent Variable: OverallhowwouldyourateyourexperiencewithChatGPTorothe_B

**Table 5.5: Coefficients Table**

(Source: Data Analysis of SPSS)

**Key Findings:**

- **Perceived Usefulness**: The perceived usefulness of ChatGPT in business operations had the most substantial impact on the overall experience, with a significant positive coefficient (.537).
- **Frequency of Use**: Frequent use of AI tools also significantly predicts a better user experience, as evidenced by its positive coefficient (.293).
- **Belief in Benefits**: Belief in the potential benefits of similar AI tools showed a positive but not statistically significant impact on the user experience.

**Conclusion**

This Multiple Linear Regression analysis highlights key factors influencing user satisfaction with ChatGPT in business settings. Businesses should focus on demonstrating the practical benefits of AI and encouraging frequent use to maximize user satisfaction.



# Qualitative

Through interviews with 8 respondents, here is the basic information for each participant:

| Respondent ID | Industry | Years in Business | Use of AI | Key AI Benefits | Main Challenges |
|---|---|---|---|---|---|
| A | F&B | 2 years | 1 years | Design help, efficiency improvements | Competition, weather effects on sales |
| B | Fashion | 3 years | 6 months | Customer service automation, inventory management | Time management, market understanding |
| C | Fashion | 4 years | Several months | Content creation, | Inventory management, |

| | | | | | |
|---|---|---|---|---|---|
| | | | | customer engagement | customer acquisition |
| D | Crafts | 1 years | 1 years | Content creation, customer communication | Expanding customer base, niche market competition |
| E | Apparel | 1 years | Used briefly | Cost analysis, strategic suggestions | Gaining initial customer base, managing finances |
| F | Beverage | 2 years | Over 1 year | Content creation, promotion planning | Attracting customers in competitive market |
| G | Apparel | 3 years | Recently started | Inspiration and design ideas | Building customer base, staying financially stable without salary |
| H | E-commerce | 2 years | 1 years | Concept development, detailed product descriptions | Inventory management, marketing and content creation |

**Table 5.6: Summary of Interviewee Profiles**



## 4.6 Content Analysis

### Introduction

This section explores the qualitative insights derived from interviews with eight entrepreneurs who have integrated AI tools like ChatGPT into their operations. The analysis focuses on their motivations, experiences, challenges, and the perceived impact of AI on their businesses.

- ✓ **AI Adoption Motivations and Applications**

Entrepreneurs are leveraging AI to address specific operational inefficiencies and enhance customer interaction. For instance, Respondent C uses AI for "writing product descriptions and creating customer response templates," highlighting the utility of AI in managing online customer interactions effectively.

- ✓ **Challenges in Business**

The interviews revealed that external competition and operational challenges like inventory management are significant concerns. Respondent A mentioned "competition and climate" as major hurdles, showing how external factors influence business strategies, including AI adoption.

- ✓ **Perceived Benefits of AI**

AI tools significantly contribute to operational efficiency and marketing effectiveness. Respondent F noted that AI "helped plan promotions and manage social media posts," underscoring AI's role in facilitating complex marketing strategies.

- ✓ **Limitations and Areas for Improvement in AI Tools**

Despite the benefits, there are areas where AI tools could improve. Respondent H expressed a need for "more localized and personalized responses" to make AI tools more adaptable to specific business contexts.



## Conclusion

The content analysis provides valuable insights into how entrepreneurs perceive and utilize AI tools in their operations. While AI offers substantial operational benefits, there is a clear need for tools that offer greater customization and localization to meet diverse entrepreneurial needs more effectively.

## 4.7 Narrative Analysis

### Introduction

This section delves into the narratives provided by entrepreneurs during their interviews to uncover deeper insights into their personal experiences, challenges, and the impact of AI tools on their business practices. Narrative analysis helps to explore the stories behind the data, providing a richer understanding of the entrepreneurial journey and the role of AI in shaping business operations.

### Main Narratives Identified

1. **The Entrepreneurial Journey**

Entrepreneurs shared their stories of starting and growing their businesses, often highlighting the dynamic challenges they faced. For instance, Respondent G spoke about starting with no customers and gradually building a recognizable brand through persistent efforts and creative marketing strategies.

**Analysis**: These narratives showcase the resilience and adaptive strategies employed by entrepreneurs. They also highlight the critical role of innovative tools like AI in navigating the complexities of business growth.

2. **Integrating AI into Business Practices**

Several respondents narrated their initial scepticism and subsequent acceptance of AI tools. Respondent C's narrative about starting to use AI for product descriptions after seeing its effectiveness illustrates a common pattern of gradual integration based on observed benefits.

**Analysis**: This theme reflects the cautious, yet optimistic approach entrepreneurs often take toward technological adoption. It underscores the importance of demonstrable benefits in convincing business owners of the value of new technologies.

3. **Facing and Overcoming Challenges**

Narratives often cantered around specific challenges, such as dealing with competitive markets or managing supply chains. Respondent A's story about adapting his beverage business during the rainy season by adjusting inventory levels exemplifies proactive management in response to external challenges.

**Analysis**: These stories highlight the practical applications of AI and other digital tools in problem-solving and decision-making. They also reflect the entrepreneurial spirit of innovation and adaptation.

4. **Vision for the Future**

Entrepreneurs expressed their visions for leveraging AI to drive future growth. Respondent H discussed using AI to automate routine tasks and free up time for strategic thinking, suggesting a forward-looking approach to business management.

**Analysis**: This theme reflects a strategic perspective on the role of AI in business, indicating a shift from viewing technology as a tool for immediate solutions to seeing it as a long-term strategic partner.



**Integration with Quantitative Findings**

Linking these narrative insights with the quantitative data from previous sections enriches the overall analysis by providing a context for the numerical trends observed. For instance, the positive correlation between AI usage frequency and business growth metrics can be better understood through narratives that detail how AI tools specifically contribute to operational efficiencies and market expansion.

**Conclusion**

The narrative analysis provides a deeper understanding of the individual and collective experiences of entrepreneurs with AI tools. By examining the stories told by business owners, we gain insights not only into the functional impact of technology but also into the personal and strategic dimensions of its integration into business practices. These narratives reinforce the quantitative findings and offer a comprehensive view of the role of AI in contemporary entrepreneurship.

## 4.8 Discourse Analysis

**Introduction**

Discourse Analysis in this context focuses on how entrepreneurs discuss their use of AI tools, specifically ChatGPT, and how their language reflects their attitudes, beliefs, and the socio-cultural context of their business environment. This analysis seeks to uncover deeper insights into the social and communicative functions of language related to AI technology in entrepreneurship.



**Analytical Focus Areas**

1. **Language Reflecting Acceptance and Resistance**

Entrepreneurs use specific linguistic expressions that reveal their acceptance or resistance towards AI technologies. For example, phrases like "I just started using it because everyone does" from Respondent C suggest a social conformity motive behind AI adoption.

**Analysis**: Such expressions help to identify social drivers and barriers to technology adoption, highlighting the role of peer influence and industry trends in decision-making processes.

2. **Describing AI Interactions**

The way entrepreneurs describe their interactions with AI tools can reveal underlying perceptions. Respondent F's use of terms like "assistant" and "helper" personifies the AI, indicating a view of AI as a team member rather than just a tool.

**Analysis**: This linguistic personification suggests a deeper integration of AI into the operational self-concept of the business, potentially affecting how strategic decisions are communicated and conceptualized.

3. **Narratives of Empowerment and Limitation**

Discourse on the impact of AI on business capabilities often swings between empowerment and limitation. Respondent H mentions, "AI is a game-changer," highlighting empowerment, whereas concerns about "AI's limitations" from Respondent D reflect perceived barriers.

**Analysis**: The juxtaposition of empowerment and limitation in the discourse provides insights into the complex relationship entrepreneurs have with technology, balancing optimism with pragmatic realism.



4. **Future-Oriented Language**

The anticipation of future benefits and potential expansions, as discussed by entrepreneurs, often includes modal verbs like "could," "will," and "might." This forward-looking language, as used by Respondent B, underscores the aspirational aspect of AI adoption.

**Analysis**: Understanding these linguistic choices helps to gauge the expectations and strategic foresight of entrepreneurs, indicating how AI is seen as a part of future business landscapes.

**Integration with Quantitative Findings**

This discourse analysis complements the quantitative findings by providing a linguistic foundation to the statistical data. For instance, the significant positive perception of AI's usefulness found in the regression analysis can be linguistically traced to the empowering language used by respondents when they discuss AI's benefits.

**Conclusion**

Discourse analysis reveals the layers of meaning behind how entrepreneurs talk about AI. By examining the language used in interviews, we gain a deeper understanding of the cognitive and social dynamics that influence AI adoption in the entrepreneurial sector. This linguistic perspective not only enriches our understanding of the quantitative data but also highlights the broader social narratives that shape technology integration in business practices.



**4.9 Validity and Reliability**

**Introduction**

Ensuring the reliability and validity of measurement instruments is critical in research, as it substantiates the integrity and robustness of the data collected. This section presents the reliability analysis of the measurement instruments used in the quantitative portion of this study, utilizing Cronbach’s Alpha to evaluate internal consistency.

**Case Processing Summary**

| | | N | % |
|---|---|---|---|
| Cases | Valid | 324 | 100.0 |
| | Excluded[a] | 0 | .0 |
| | Total | 324 | 100.0 |

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

**Figure 5.3: Case Processing Summary**
(Source: Data Analysis of SPSS)

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .812 | 4 |

**Figure 5.4: Reliability Statistics**
(Source: Data Analysis of SPSS)



**Reliability Analysis**

To assess the reliability of the scales used in the survey, Cronbach's Alpha was calculated. This statistical test measures the degree to which a set of items are correlated, providing an index of the consistency of the respondents' answers.

- **Data Description**: The analysis was conducted on a scale consisting of four items, designed to measure [**HowdoyouperceivetheusefulnessofChatGPTinyourbusinesso_B**, **TowhatextentdoyoubelieveChatGPTorsimilarAItoolscould_B**, **FreqUseAI_num**, **OverallhowwouldyourateyourexperiencewithChatGPTorothe_B**].
- **Cronbach's Alpha Result**: The reliability analysis resulted in a Cronbach's Alpha of .812, indicating very good internal consistency among the scale

items. This suggests that the items reliably measure the same underlying construct and are thus suitable for further analysis.

- **Interpretation**: A Cronbach's Alpha value of .70 or higher is generally considered acceptable, values above .80 are deemed very good, and those above .90 are considered excellent. Therefore, the obtained alpha of .812 assures us of the reliability of our scale.

**Validity Considerations**

While reliability is crucial for consistency, validity determines the accuracy and appropriateness of the conclusions drawn from the data.

1. **Content Validity**: The scale items were developed based on a thorough review of the literature and validated through expert feedback, ensuring that they comprehensively cover the construct of interest.
2. **Construct Validity**: The factor analysis conducted in section 4.3 supports the construct validity of the survey items, confirming that they accurately represent the theoretical constructs they are intended to measure.



**Conclusion**

The reliability and validity tests conducted as part of this study confirm that the measurement instruments are both reliable and valid. The high Cronbach's Alpha value underscores the internal consistency of the survey items, ensuring that the findings from the quantitative analysis are based on reliable data. This rigor in measurement supports the overall validity of the study's conclusions, providing a solid foundation for the interpretation of the data and the implications drawn therefrom.

# CHAPTER 5

# CONCLUSION AND RECOMMENDATION

## 5.1 Introduction

This chapter concludes the investigation into the role of ChatGPT as a digital assistant for startup entrepreneurs. The study was driven by the objective to understand how ChatGPT can aid entrepreneurs in navigating their business challenges and enhancing operational efficiency. Utilizing a mixed-method approach, the research integrated quantitative analysis conducted through SPSS with qualitative insights derived from semi-structured interviews. This comprehensive methodology allowed for a nuanced exploration of the impacts and perceptions of ChatGPT within the entrepreneurial ecosystem.

## 5.2 Summary of Findings

The research explored the integration of ChatGPT as a digital assistant within startup enterprises, employing a mixed-method approach to thoroughly examine its impact on business operations.

**Quantitative Findings:**

The quantitative analysis revealed significant enhancements in operational efficiency, as startups reported substantial reductions in time allocated to customer inquiries and administrative tasks, attributing these gains to the automation capabilities of ChatGPT. Moreover, the data indicated a positive relationship between ChatGPT usage and customer engagement levels; startups utilizing the tool for customer service noted improved satisfaction and retention rates. Entrepreneurs also recognized ChatGPT's contribution to innovation, particularly in processing large datasets that facilitate the identification of emerging market trends and customer preferences.

**Qualitative Findings:**

The qualitative insights complemented these findings, with entrepreneurs detailing how ChatGPT supports strategic decision-making through real-time data analysis and scenario simulations. Such capabilities were especially valued in areas requiring rapid and informed decision-making, including strategic planning and crisis management. However, challenges were also noted, particularly the need for human oversight in managing complex customer interactions and ensuring content relevance, highlighting areas where ChatGPT integration could be improved.

Furthermore, there was a strong sense of optimism about the future potential of ChatGPT, with many entrepreneurs planning to expand its use into more complex areas such as predictive analytics and personalized marketing campaigns. This enthusiasm is tempered by a recognition of the need for strategic implementation and ongoing adaptation to maximize the benefits of ChatGPT in line with specific business requirements.

Together, these findings paint a comprehensive picture of the current and potential impact of ChatGPT on startup enterprises. While the tool brings considerable benefits in terms of efficiency and customer engagement, realizing its full potential requires careful integration and continuous refinement to meet the evolving needs of businesses.



## 5.3 Discussion

**Interpretation of Results:**

The findings from this research offer insightful revelations about the utility of ChatGPT as a digital assistant for startup entrepreneurs. Quantitatively, the substantial improvement in operational efficiency highlights ChatGPT's strength in automating routine tasks, which directly contributes to resource optimization and allows entrepreneurs to focus on core business strategies. This automation extends beyond

mere administrative assistance to influencing customer relations management, where its deployment correlates with enhanced customer engagement and satisfaction. This correlation is likely driven by ChatGPT's ability to provide quick, consistent, and informative interactions, which are crucial in today's fast-paced market environments.

Qualitatively, the data underscores the strategic value of ChatGPT in decision-making processes. Entrepreneurs appreciate the tool's capacity to simulate various business scenarios and provide actionable insights, which are essential for informed decision-making and long-term strategic planning. However, the challenges noted, such as the need for human oversight, reflect a critical limitation in current AI technologies. Despite their advanced capabilities, tools like ChatGPT require a nuanced understanding of context and human emotion, areas where human intervention remains vital.

**Integration of Findings:**

Integrating these findings with the broader academic discourse on AI in entrepreneurship, this research contributes to an evolving narrative that views AI not just as a technological tool, but as a strategic business partner. The results align with existing studies that emphasize AI's role in enhancing efficiency and decision-making but also highlight the persistent challenges of integrating AI seamlessly into complex human-centric processes. This study adds depth to the understanding of AI's application in startups by detailing both its operational benefits and the subtleties of its practical implementation.

Moreover, the enthusiastic reception of ChatGPT's potential for future applications suggests a growing trend among startups to invest in advanced AI capabilities, reflecting a shift towards more dynamic, AI-driven business models. This shift may encourage further research and development in AI technologies, geared specifically towards enhancing their adaptability and effectiveness within various entrepreneurial contexts.

In summary, the discussion of these findings illuminates the dual role of ChatGPT as both a facilitator of routine operations and a catalyst for strategic

innovation. By doing so, it underscores the necessity for ongoing improvements in AI technology, aiming for a balance between automation and the irreplaceable nuances of human judgment.

## 5.4 Theoretical and Practical Implications

**Theoretical Implications:**

The study's findings contribute significantly to the body of knowledge on artificial intelligence and its application within entrepreneurial settings, particularly in the context of startups. Theoretically, this research extends the conceptualization of AI as more than just a tool for operational automation; it emerges as a critical element in the strategic decision-making process. By demonstrating how ChatGPT can influence not only operational efficiency but also strategic and innovative business capacities, this study challenges and expands existing theories related to technology adoption and business process reengineering in the digital age.

Moreover, the identified challenges of integrating AI like ChatGPT into more nuanced aspects of business operations such as customer relationship management and decision-making nuances add to the discourse on the limitations of AI. This contributes to theories of technology limitation in business, suggesting areas where human-AI interaction models could be further refined to enhance effectiveness and efficiency. Thus, this research helps in bridging the gap between the capabilities of current AI technologies and the theoretical frameworks that explain their integration and impact on business models.

**Practical Implications:**

Practically, the implications of this research are manifold and highly relevant for entrepreneurs, technology developers, and policymakers. For startup entrepreneurs, the demonstrated benefits of ChatGPT in improving efficiency and customer engagement underscore the importance of integrating AI technologies into their

business processes. This study provides them with a clear indication of the potential returns on investment in AI technologies and offers a blueprint for areas where ChatGPT can be most effectively deployed.

For developers of AI technologies, the insights into the operational challenges and the limitations perceived by users suggest specific areas for further development. Enhancing the contextual understanding and emotional intelligence of AI could make tools like ChatGPT more adaptable and useful across a broader spectrum of business activities, potentially increasing their marketability and applicability.

Lastly, for policymakers, the findings emphasize the need for supportive frameworks that can facilitate the integration of AI technologies in startups. This could involve funding research and development in AI, providing incentives for AI adoption in small businesses, or developing regulations that ensure the ethical use of AI technologies.

In summary, the study not only underscores the utility of ChatGPT in various business functions but also highlights the critical areas where enhancements are necessary. By delineating these practical and theoretical implications, the research not only guides current users and developers of AI technologies but also informs policy frameworks that aim to support technological innovation in the entrepreneurial ecosystem.



## 5.5 Recommendations

**For Entrepreneurs:**

Based on the comprehensive findings of this study, several strategies can be recommended to entrepreneurs for the effective utilization of ChatGPT:

- **Strategic Integration of ChatGPT:**

  Entrepreneurs should consider integrating ChatGPT strategically into their business operations to enhance operational efficiency and customer

engagement. It is advisable to start with functions that require high levels of repetitive tasks, such as customer support or data entry, where ChatGPT can quickly demonstrate its value through time and cost savings.

- **Training and Adaptation:**

  Given the challenges associated with understanding complex customer interactions, entrepreneurs should invest in training for both their teams and the AI itself. Customizing ChatGPT to better understand the specific needs and contexts of the business can improve its effectiveness and reduce the oversight required by human operators.

- **Innovative Applications:**

  Entrepreneurs are encouraged to explore innovative applications of ChatGPT beyond traditional uses. For instance, leveraging its capabilities for market research or in generating business insights from large volumes of data can provide strategic advantages in decision-making and innovation.

- **Ethical Considerations:**

  As AI tools like ChatGPT become more integral to business operations, entrepreneurs must also consider the ethical implications, particularly in terms of data privacy and the potential for bias. Establishing clear guidelines and ethical standards for AI use will be crucial in maintaining trust with customers and stakeholders.



**For Future Research:**

While this study has provided valuable insights, several areas for further research have been identified:

- **Longitudinal Studies**: Future research should consider longitudinal studies to assess the long-term impacts of AI integration within startups. Such studies can help in understanding how the benefits and challenges of AI tools like ChatGPT evolve as the technology and business grow.

- **Comparative Studies**: Researchers should conduct comparative studies to evaluate the effectiveness of ChatGPT against other AI tools and human operators in various business functions. This can help in identifying specific areas where AI tools have distinct advantages or limitations.
- **Cross-Industry Analysis**: Further research is needed to examine how ChatGPT performs across different industries. Insights from a cross-industry analysis can highlight sector-specific challenges and opportunities, providing a more detailed map of where AI tools can be most effectively deployed.
- **AI Training and Adaptation Processes**: Investigating the training and adaptation processes for AI tools in business settings can provide valuable information on how to enhance their learning algorithms for better performance and reliability. Research focusing on these aspects can lead to more robust and adaptable AI applications.

## 5.6 Conclusion

This research has thoroughly examined the role of ChatGPT as a digital assistant in startup environments, revealing its significant impact on enhancing operational efficiency, improving customer engagement, and facilitating innovation. Through a mixed-methods approach, the study not only quantified the benefits of ChatGPT but also provided a nuanced understanding of the challenges faced by entrepreneurs in integrating this AI technology effectively.

The findings highlight ChatGPT's potential as a transformative tool for startups, capable of automating routine tasks and providing actionable insights that support strategic decision-making. However, the research also uncovered the critical need for ongoing training and customization of AI tools to meet specific business needs and the importance of human oversight in complex customer interactions. These insights are vital for entrepreneurs who are considering integrating AI into their business processes, as they underscore the balance needed between technological adoption and human intuition.

Moreover, the study contributes to the theoretical framework on AI in business, expanding current knowledge on the integration of AI tools like ChatGPT in startup operations. It bridges gaps in the literature by detailing both the operational and strategic roles of AI, offering a comprehensive view of its application across different business functions.

In practical terms, this research provides actionable recommendations for entrepreneurs to harness the full potential of AI technologies, emphasizing the importance of ethical considerations and the strategic alignment of AI capabilities with business objectives. It also outlines directions for future research, suggesting areas where deeper exploration could yield further valuable insights, such as longitudinal studies on AI impact and cross-industry analyses of AI effectiveness.

In conclusion, as AI continues to evolve, its integration into business practices must be managed with a strategic approach that aligns with long-term business goals and ethical standards. The insights derived from this study of ChatGPT as a digital assistant offer valuable guidelines for startups looking to leverage AI for sustainable growth and competitive advantage. The journey of integrating AI into business is complex and ongoing, but with the right approaches and considerations, it holds the promise of significant rewards.

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# APPENDICES

## APPENDIX A GANTT CHART PSM 1

| No. | Activities | PSM 1 | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Weeks (Target within 15 weeks) | | | | | | | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1 | Briefing PSM 1 | | | | | | | | SEMESTER BREAK | | | | | | | |
| 2 | Topic Selection | | | | | | | | | | | | | | | |
| 3 | Write Chapter1: Introduction | | | | | | | | | | | | | | | |
| 4 | Correction of Chapter 1: | | | | | | | | | | | | | | | |
| 5 | Write Chapter 2: Literature Review | | | | | | | | | | | | | | | |
| 6 | Correction of Literature Review | | | | | | | | | | | | | | | |
| 7 | Write Chapter 3: Research Method | | | | | | | | | | | | | | | |
| 8 | Correction of chapter 3: Research Method | | | | | | | | | | | | | | | |
| 9 | Final Draft submission | | | | | | | | | | | | | | | |
| 10 | Report Correction | | | | | | | | | | | | | | | |
| 11 | Slide preparation | | | | | | | | | | | | | | | |
| 12 | Presentation PSM 1 | | | | | | | | | | | | | | | |
| 13 | Report Submission | | | | | | | | | | | | | | | |

## APPENDIX B GANTT CHART PSM 2

| No | Activities | PSM 2 | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Weeks (Target within 15 weeks) | | | | | | | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1 | Completion of Questionnaire | | | | | | | | | | | | | | | |
| 2 | Distribute Questionnaire | | | | | | | | | | | | | | | |
| 3 | Data collection and pilot test | | | | | | | | | | | | | | | |
| 4 | Data analysis | | | | | | | | | | | | | | | |
| 5 | Completion of data analysis | | | | | | | | | | | | | | | |
| 6 | Chapter 4: Discussion, Analysis | | | | | | | | | | | | | | | |
| 7 | Completion: Chapter 4 | | | | | | | | | | | | | | | |
| 8 | Write Chapter 5: Conclusion | | | | | | | | | | | | | | | |
| 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

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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

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Research Project Survey Questionnaire:

**CHATGPT AS A DIGITAL ASSISTANT FOR STARTUP ENTREPRENEURS**

*This survey aims to explore the experiences and perceptions of startup entrepreneurs regarding the use of ChatGPT as a digital assistant. Your participation will help us understand the challenges entrepreneurs face and how AI tools like ChatGPT can impact business operations and outcomes. The survey will take approximately 10-15 minutes to complete. All responses are anonymous, and the data collected will be used solely for academic research purposes. Thank you for your valuable time and insights!*

**Statement of Confidentiality:**

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

**References:**


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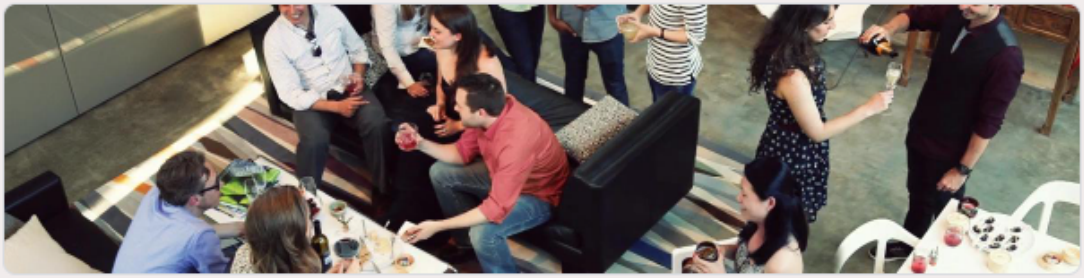

# Survey on the Use of ChatGPT as a Digital Assistant for Startup Entrepreneurs

*This survey aims to explore the experiences and perceptions of startup entrepreneurs regarding the use of ChatGPT as a digital assistant. Your participation will help us understand the challenges entrepreneurs face and how AI tools like ChatGPT can impact business operations and outcomes. The survey will take approximately 10-15 minutes to complete. All responses are anonymous, and the data collected will be used solely for academic research purposes. Thank you for your valuable time and insights!*

* Indicates required question



***PART 1: Demographic Information***

Age *

- ◯ 18-25
- ◯ 26-30
- ◯ 31 and above

Gender *

- ◯ Male
- ◯ Female

Education Level *

- ◯ High School Diploma or below
- ◯ Master's Degree and above
- ◯ Bachelor's Degree

Entrepreneurial Experience *

- ◯ 5 - 10 years
- ◯ Less than 5 year
- ◯ More than 10 years

***PART 2: Business Information***

Industry *

- ◯ Retail
- ◯ Service
- ◯ Technology
- ◯ Manufacturing
- ◯ Other

Size of Business *

- ◯ Micro (<10 employees)
- ◯ Small (10-50 employees)
- ◯ Medium (51-200 employees)
- ◯ Large (>200 employees)

Years in Operation *

- ◯ Less than 1 year
- ◯ 1-5 years
- ◯ 6-10 years
- ◯ More than 10 years

***PART 3: Familiarity with AI Tools***

Are you familiar with AI tools like ChatGPT? *

- ◯ Yes
- ◯ No

How frequently do you use AI tools in your business operations? *

- ◯ Never
- ◯ Rarely
- ◯ Daily
- ◯ Weekly
- ◯ Monthly

***PART 4: Perceptions of ChatGPT***

How do you perceive the usefulness of ChatGPT in your business operations? *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Strongly Disagree | ◯ | ◯ | ◯ | ◯ | ◯ | Strongly Agree |

Which areas of your business do you think ChatGPT could assist with? *

- ◯ Customer service
- ◯ Marketing
- ◯ Product development
- ◯ Operations

What are your primary concerns about using ChatGPT? *

- ◯ Data privacy
- ◯ Accuracy
- ◯ Integration issues
- ◯ Cost

***PART 5: Challenges and Needs***



What are the main challenges you face as an entrepreneur? *

- ◯ Financial constraints
- ◯ Time management
- ◯ Access to market insights
- ◯ Innovation and product development
- ◯ Customer engagement
- ◯ Regulatory and compliance issues

How significant are these challenges in your business operations? *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Not Significant | ◯ | ◯ | ◯ | ◯ | ◯ | Extremely Significant |

Which existing tools or strategies do you use to address these challenges? *

- ◯ Manual processes (e.g., spreadsheets, notebooks)
- ◯ Digital tools (e.g., CRMs, ERP systems)
- ◯ Outsourcing to third-party services
- ◯ Seeking mentorship or advisory support

To what extent do you believe ChatGPT or similar AI tools could help address these challenges? *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Not at All | ◯ | ◯ | ◯ | ◯ | ◯ | To a Great Extent |

***PART 6: Overall Assessment***

Overall, how would you rate your experience with ChatGPT or other AI tools? *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Terrible | ◯ | ◯ | ◯ | ◯ | ◯ | Excellent |

Would you recommend other entrepreneurs to use AI tools like ChatGPT? *

- ◯ Yes
- ◯ No