

6 Co-Creation in Modern Business Education in Macau

Digital Technology and AI-Based Innovative Practices in Agentic Marketing, E-Commerce and Decision Analysis

Caleb Huanyong Chen, Helmond Hio Nam Io, and Chunsheng Li

6.1 Introduction

Macau, as a Special Administrative Region (SAR) of China, has been recognized as a well-known city for gambling and tourism, which has greatly contributed to its economic development. However, overly depending on one single industry of gaming, Macau faces economic vulnerabilities, leading the Macau Government to launch the “1+4” economic diversification strategy. The goal of this strategy is to promote continuous growth by continuing to rely on tourism and leisure as the main sector (“1”) while advancing four emerging areas (“4”) including Big Health, Modern Financial Services, High Technology, along with Convention and Exhibition (MICE), Culture and Sports.

The “1+4” strategy is not merely an economic slogan but a call to action for all societal sectors, with education included, to prioritize these goals. In particular, emphasis is placed by the High Technology sector on using artificial intelligence (AI) and advanced technologies to inspire innovation across different industries. For example, AI can enhance financial services by using predictive analytics, which also offer potential to change marketing approaches in tourism and MICE fields. As Macau moves toward a more balanced economy, higher education becomes essential for supplying talents with the abilities needed to advance these sectors. Among these directions, the High Technology sector, which includes AI and big data technologies, stands out for its role in changing business and marketing (Kumar et al., 2021), thereby helping to build a communicative bridge between China and Portuguese-speaking countries.

AI includes technologies that allow machines to execute tasks needing qualities such as reasoning, learning and problem-solving, making it essential to contemporary business and altering the ways how businesses operate. AI in marketing allows firms to leverage large amounts of data, anticipate how customers act, tailor marketing efforts and automate repetitive work, allowing marketers to focus on strategic initiatives. Deploying autonomous AI agents

to reason, plan and execute marketing strategies independently, agentic marketing represents breakthrough progress in this area (V. Kumar et al., 2024). Compared to rule-based automation in traditional marketing, agentic marketing makes use of AI systems that change content, timing, and interactions in real time in response to new data and behavior. In the following sections, it will be demonstrated how agentic marketing fits neatly into each phase of the marketing process mentioned. Consequently, agentic marketing greatly benefits companies in Macau's diverse economy, especially in tourism, financial services and MICE sectors, which require highly personalized customer interactions.

To help students prepare for Macau's economic transformation and business development in related sectors, business schools must include AI in their education. In marketing area, AI has reinvented customer engagement by supplying tools for analyzing data, customizing content and automating tasks (Rusthollkarhu et al., 2022). Generative AI has been increasingly used by businesses, making human-AI co-creation a new normal in various scenarios when brands interact with consumers. And the current development of AI is moving to agentic AI. With the modern trend called "agentic marketing", which lets autonomous AI agents run marketing operations with little involvement from people, such agents analyze customer needs, use chat interfaces to connect, facilitate sales and offer support after a purchase, leading to better and faster marketing. This chapter discusses how universities in Macau make use of generative AI and agentic AI technologies in the education and training of business students.

The following sections include discussions of AI applications and business education along the stages of customer journey and purchase process. We highlight four stages: (1) Brand Recognition: Adopting AI in logo design (e.g., color analysis), making brand identity compelling and meaningful to target customers; (2) Advertising: Running narrative advertising campaigns to reach and attract potential customers, which is based on AI-generated ad scripts; (3) During Purchase: Ensuring that customers receive immediate and useful information and thereby increasing their confidence in purchase decision-making; and (4) After Purchase: Continuously engaging with customers when customers post online reviews after purchase, for which agentic AI is used to manage comments and reply automatically. The above stages cover the whole process of brand-customer interactions before, during and after purchase. This design can enhance students' understanding, learning and application with a framework. Customer-relationship management (CRM) is the fundamental philosophy behind all these conducts. The aim is to build students' business mindset beyond the technological aspect of AI applications.

6.2 Digital Visualization for Brand Recognition

This section focuses on digital visualization for brand recognition, taking brand logo as an example. As Saini and Dudkiewicz (2025) surveyed, 75% of consumers identify a brand by its logo. A 23% increase in revenue is associated

with consistent logo usage across platforms; 60% of consumers steer clear of brands with outdated or unattractive logos. Additionally, 80% of people believe that color is crucial for brand recognition. For decades, researchers also found that the strategic use of shapes and colors can help differentiate brands from competitors and influence consumer perceptions by altering moods and emotions (e.g., Celhay & Luffarelli, 2024; Hoek & Gendall, 2010; Singh, 2006). This makes shape and color crucial elements of perceptual marketing strategies. Consequently, marketing professionals have traditionally harnessed the power of shape and color to influence consumer perception and attract customers. Shape and color affect consumer behavior and feelings, evoke emotions and help businesses stand out from their rivals, which in relation to a particular brand significantly influences how the brand is perceived in the market. Thus, this section focuses on three main objectives related to the shape and color of logos:

1. teach students how to collect relevant data from various digital resources and build a database for brand logos;
2. teach students what digital technology and AI tools to use for pattern identification and information extraction from the database; and
3. let students design a logo based on what they learned.

6.2.1 Data Collection from Various Digital Resources

Data collection from various digital resources involves gathering information using technological tools and online platforms. This encompasses a wide range of methods, including social media monitoring, online surveys and web scraping/analytics. The process often involves data source identification, collection instrument design, data quality insurance and ethical consideration.

Digital resources refer to a wide array of online materials that are accessible via the internet. These resources include various types of content. For example, academic institutions and libraries provide access to scholarly articles, journals and e-books that support research and study. Social media platforms facilitate the sharing of ideas and information, allowing users to connect and engage with diverse perspectives. Additionally, multimedia resources such as videos, podcasts and interactive content enhance the learning experience by catering to different learning styles. In an increasingly digital world, digital resources serve as fundamental components for research, education, business and everyday life. Users can access information anytime and anywhere, breaking down geographical barriers that traditionally limit information dissemination. This accessibility fosters a culture of continuous learning and knowledge sharing.

In business education, on the one hand, we need to let students know that digital resources play a pivotal role in operations and strategy. We can utilize cloud-based applications for project management, collaboration and data

6.2.2 *Data Collection from Various Digital Resources*

Pattern identification and information extraction are essential processes in data analysis that allow us to derive meaningful insights from vast datasets. In today's data-driven world, the ability to recognize patterns and extract relevant information is crucial for informed decision-making. These processes are widely applicable across various business fields, including finance, supply chain, marketing and economics, where understanding underlying trends can significantly impact strategic initiatives. By employing sophisticated techniques and tools, businesses can transform raw data into actionable insights, driving growth and innovation.

The first step in pattern identification involves defining clear objectives. In business education, we should specify what we hope to achieve through pattern identification, such as identifying customer behavior trends, predicting market movements or detecting operational anomalies. In this chapter, we mainly analyze what kind of logo (e.g. shape and color) is commonly applied among different brands. Establishing these goals helps to narrow the focus and guide the choice of analytical methods. Following this, data preparation becomes a critical phase. This involves data cleaning, where issues like missing values, duplicates and inconsistencies are addressed to ensure a high-quality dataset. Once the dataset for brand logos is prepared, we can employ various techniques for pattern identification, including statistical analysis, machine learning and visual analysis.

Statistical analysis provides a foundational approach to recognizing patterns, where descriptive statistics summarize the data to reveal trends and variations. Machine learning techniques further enhance pattern identification; clustering algorithms, such as K-means, group similar data points, while classification methods, like decision trees, predict outcomes based on input features. Additionally, visual analysis tools, such as scatter plots and heatmaps, enable analysts to spot patterns visually, often revealing insights that may not be immediately apparent through raw data. Popular programming languages like Python and R, equipped with libraries for machine learning and data visualization, facilitate these analyses effectively.

Information extraction focuses on transforming unstructured or semi-structured data into structured information that can be easily analyzed. The process begins with clearly defining the information needs, such as identifying specific entities (like brand names or establishment dates), relationships between them or sentiments expressed in textual data. Diverse data sources, ranging from databases and web pages to documents, are often utilized, requiring different extraction techniques tailored to the nature of the data. Natural language processing (NLP) is a key technique in information extraction, enabling the identification of named entities, relationships and sentiments within text. Named entity recognition can classify text into predefined categories, while sentiment analysis gauges opinions expressed in the data. Regular expressions also serve as powerful tools for pattern matching, allowing for the extraction of specific information based on defined criteria.

To facilitate information extraction, several tools and technologies are available. NLP libraries such as SpaCy, NLTK and Hugging Face's Transformers are widely used for tasks like text categorization and entity recognition. Web scraping tools, including BeautifulSoup and Scrapy, enable the automated extraction of structured data from websites, while Optical Character Recognition (OCR) technology converts images of text into machine-readable formats, facilitating the extraction of information from scanned documents. By employing these techniques and tools, we can efficiently gather and process data, ultimately leading to better insights and informed decision-making. The combined processes of pattern identification and information extraction are vital for business analysts aiming to leverage data effectively, allowing them to navigate the complexities of modern data landscapes and drive strategic initiatives forward.

Identifying and extracting color patterns from brand logos involves analyzing visual elements to determine dominant hues, their combinations and their associations with industries or brand identities. We let students use computer vision techniques (e.g., contour detection, deep learning models) to isolate the logo from backgrounds, and then apply color extraction methods such as K-means clustering or histogram analysis to identify primary and secondary colors, converting them into standardized formats (e.g., Pantone codes). Pattern recognition categorizes colors by frequency, industry trends (e.g., blue for tech, red for food) and psychological associations. Multi-brand comparisons reveal competitive color strategies. The extracted data (i.e., structured into color palettes and industry mappings) helps with branding research, competitor analysis and marketing strategy, which is vital for designers, marketers and AI-driven branding solutions. Figure 6.2 shows an example of color preferences for men and women.

6.2.3 Project Assignments

6.2.3.1 Individual Project

In this project, students are asked to conduct an in-depth exploration of how leading global brands leverage visual identity (e.g., color, typography, design) to strengthen brand recognition, and analyze case studies (e.g., Apple's minimalist aesthetic, Coca-Cola's iconic red, Nike's dynamic typography) to understand the psychological and cultural impact of these choices. The deliverable is a concise two-page report summarizing key findings, supported by references from academic papers, brand guidelines or industry articles. This exercise aims to build foundational knowledge in visual branding and prepare students for hands-on design tasks by grounding their work in real-world examples.

6.2.3.2 Group Project

One section is divided into several groups to accomplish the project. Each group has to analyze the visual identities of major brands by using tools like Python or web-based platforms to extract dominant color palettes from

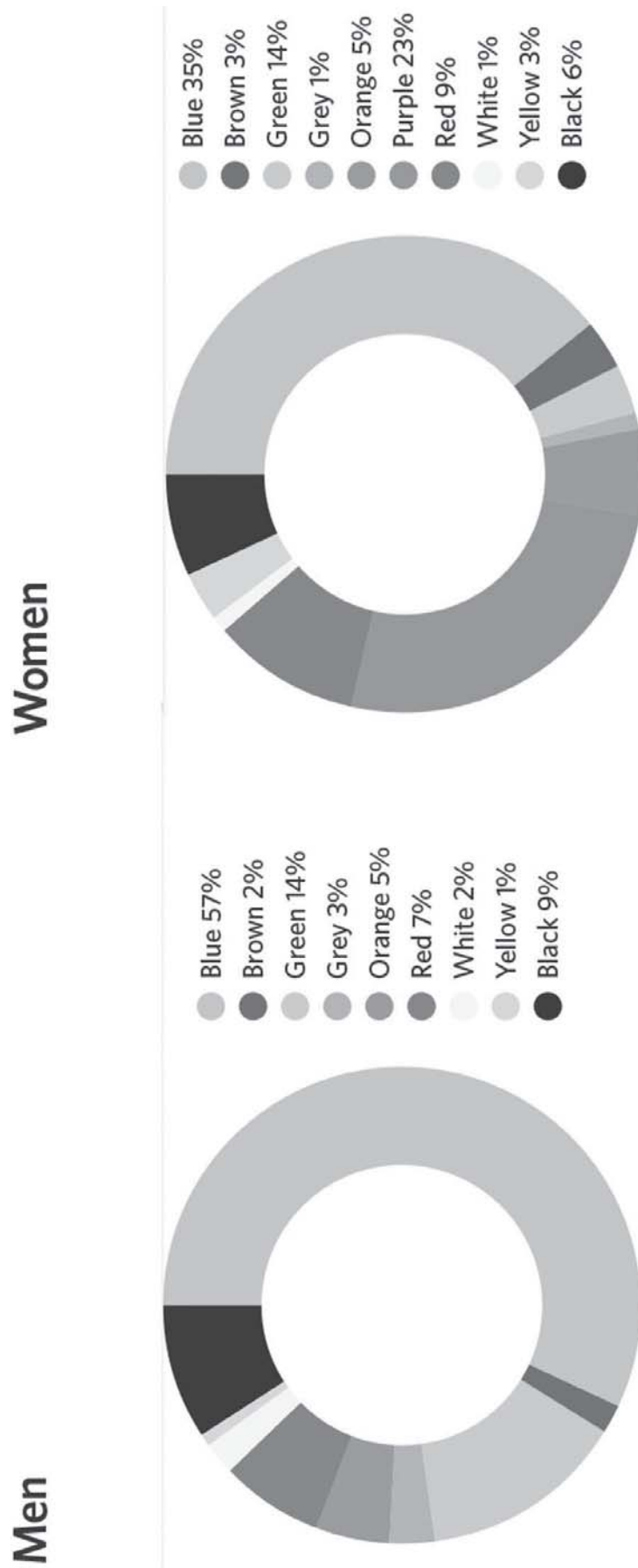


Figure 6.2 Men's and women's favorite colors
(adapted from Patel, 2025)

logos, and document HEX/RGB codes and interpret the psychological and cultural associations of these colors (e.g., why Starbucks uses green for trust and growth). This hands-on exercise bridges design theory and technical skills, helping students recognize how strategic color choices influence brand perception.

Each group is also asked to create a fictional brand (complete with a logo, color scheme, typography and style guide) and present their concept within 10 minutes. Using tools like Photoshop, Figma or Canva, they need to justify their design decisions (e.g., “We chose blue for professionalism”) and demonstrate how their visual identity aligns with target audiences. This project simulates real-world branding challenges, fostering creativity, collaboration and data-driven design thinking.

6.3 AI-Generated Advertisement Scripts for Promotions

6.3.1 Applications of AI-Generated Content in Marketing

Generative AI is changing marketing (Kshetri et al., 2024). In marketing, generative AI can be used to generate marketing content for various purposes when brands communicate with consumers (Hartmann et al., 2025). In this section, we aim to demonstrate how AI-generated content can facilitate marketing promotions with the purpose of increasing brand awareness before consumers’ purchase decision-making. When presenting marketing messages on websites, apps, e-commerce platforms or social media pages, the key of AI-generated content is to grab potential consumers’ attention and give them positive impressions on the brand. The traditional way of doing the job was to employ copywriters, resulting in costs and labor time. Yet, generative AI is changing modern marketing. The latest generative AI tools are developed based on large language models (LLM), such as GPT-4, Gemini and DeepSeek. They allow marketers to create high-quality marketing messages more easily and efficiently. To consumers, AI-generated content can enhance personalized marketing communications by providing appealing information in terms of brand value propositions, product features and customer interests. As AI creates more attractive content to increase brand awareness, there would be more customer-brand engagement, thereby enhancing customer attitudes and purchase intention.

While there are numerous marketing areas that generative AI can be used in, this section focuses on advertising with AI-generated content. Many marketing courses or modules may include a chapter of advertising, especially digital display advertising in contemporary marketing education and practices. Taking digital marketing (Chaffey & Ellis-Chadwick, 2022) for example, instructors can utilize AI-generated content for digital display advertising under two scenarios: one is the touchpoint of social discovery or remarketing in the customer journey map, and the other is the stage of reach in the RACE model.

The customer journey map illustrates how brands can use digital tools to interact with customers during their purchase decision-making process. There are four stages with multiple touchpoints in each stage: awareness, consideration, purchase and post-purchase experience. Instructors can select awareness and consideration as scenarios to demonstrate the use of AI-generated content for advertising.

1. Awareness: At the beginning, brands need to build awareness in customers' minds. The key is to create stimuli and inspiration to shape potential customers' understanding and impressions on the brand. Given the prevalence of social media in brand-customer communications, generative AI can help create attractive advertisements, which can enhance exposure and spread on social media for brand awareness.
2. Consideration: This stage is to develop customer interest and preference. After customers visit brands' online sites (e.g., websites, social media pages, APPs), remarketing with advertisements to the visitors can highlight brands' value propositions.

Regarding the RACE model, there are four stages: reach, act, convert and engage marketing (Chaffey & Ellis-Chadwick, 2022). The reach stage can be selected to enhance students' understanding of advertising based on AI-generated content. The aim is to build awareness and visibility of a brand by publishing marketing content. Students should learn that the creation of such marketing content can be facilitated by AI.

After introducing the above scenarios, instructors should emphasize the purposes and benefits of applying AI in creating content for advertising. It is critical that the content of advertisements be able to touch target consumers, arousing their positive emotions and attitudes toward the brand. And such interactions are necessary to prepare potential customers' impressions, interests and preferences until they finally make the purchase decision. To effectively conduct advertising, marketers can use AI to generate content to influence consumers' consumption decisions. AI-generated advertisements should be able to impress them with moving words and appealing images, which shape brand images in customers' minds. Therefore, in the next section, we will illustrate how narrative advertising can be facilitated by generative AI.

6.3.2 AI Co-creation in Narrative Advertising

Narrative advertising refers to using stories to communicate marketing messages with consumers. It is a special type of advertising to grab consumers' attention and enhance their understanding through arousing consumers' emotions. As aroused emotions reinforce consumers' memory, the emotional experience of narrative advertising builds a connection between brand and consumers. Narrative transportation has been used to explain the process of information transmission, consumer immersion, engagement and persuasion

(Phillips & McQuarrie, 2010). As AI has been increasingly used in advertising, recent research has started exploring approaches for online narrative advertising with the co-creation of AI (Sun et al., 2024).

Traditional content marketing faces challenges in effectiveness and efficiency. The market is flooded with countless messages. Marketers need to create creative and touching content to attract consumers' attention. To meet the huge demand for idea creation, companies need to spend a lot of money on labor hours or copywriting services to create high-quality and original content. Companies usually need a team of skilled professionals like writers, designers, and editors. Besides, in the fast-changing marketing environment, efficiency is crucial to catch hot topics and trends at the moment. However, the production procedures are time-consuming and laborious. From ideation to distribution, a piece of marketing message costs a period of time and repeatedly needs confirmation on details. Inability to keep pace with market trends may lose opportunities to communicate with customers to build brand awareness.

The above background reminds students of the value of using AI to create narrative advertisements. The following section provides an example to illustrate how students may master the skill by following the instructions.

6.3.3 Practice: Tool, Template and Output

In this example, we set a scenario of advertising as a brand would like to launch a narrative advertisement video on TikTok to reach certain target segments of Chinese customers. Options of AI tools, a customized template and prompts for generating outputs are provided.

For advertising to Chinese customers on TikTok, in this example, we recommend *Feishu* as a generator ad scripts. *Feishu* is a productivity tool that combines the feature of spreadsheets with the flexibility of databases. Users can invoke AI shortcuts (e.g., Deepseek R1, Kimi, Doubao) and prompt them with clear instructions.

Then, the task is to prepare some basic information for AI to create ad scripts. The content design of an advertisement may include numerous considerations. Students will be overwhelmed if the instructor throws a lot of information to them. To make it simple and efficient, we design a template with customized items. Following this template, students can understand the essential input elements required to design an attractive narrative. With the help of generative AI, these input elements facilitate the creation of a narrative advertisement to achieve an ideal output with minimal effort.

The template includes three parts (see Table 6.1):

1. Story setting: What kind of story do you want to tell?

The first part sets the basic idea for the storyline. Three items are essential.

- i. Inspiration: a very brief idea for the story. Maybe there is a spark in a marketer's mind, although it still lacks details to develop the plot, characters and other settings for a full story. The marketer

Table 6.1 A template for AI-generated ad scripts

	<i>Template items</i>	<i>Description</i>
Story setting	Inspiration	Give AI a very brief story idea
	Style	Blogger characteristics or specific presentation styles
Marketing elements	Content category	The vertical field of the ad video according to TikTok's categorization
	Brand	The brand placed in ad
	Keywords	Hashtags or topics of ad
Other	Target consumer	Target consumers who are expected to watch the ad
	Time	Ad length
	Budget	Amount of cost to produce the ad

- just needs to fill in the template with a short sentence, a couple of phrases, or just a vague concept. It is easy to start with a simple and brief inspiration, which yet is enough to guide AI in the direction of the narrative of the ad.
- ii. **Style:** the tone of the narrative. It could be about the emotional tone, such as warm, humorous, joyful or gloomy. It also could be a way of presentation, such as documentary, daily vlog or fantasy. Additionally, the narrative style may fit the characteristics of the TikTok channel or the vlogger where the ad video will be launched.
 - iii. **Content category:** a selection among TikTok's video categories. The categorization will affect the visibility of the ad and the competition with other videos under the same category. A wise choice may ensure that the ad will be effectively pushed and recommended by the algorithm.
2. **Marketing elements:** brand- and marketing-related information that is essential for advertising.
 - i. **Brand:** the brand to be placed in the narrative.
 - ii. **Keywords:** hashtags or topics that describe the key message to convey through the advertisement. They can be referred to particular value propositions, images or other characteristics of the brand. They will be integrated into the narrative because narrative advertising is not just telling compelling stories but also should serve particular branding goals.
 - iii. **Target consumer:** target segments of audience who are expected to watch the advertisement video. The target should be attracted by the narrative.
 3. **Other:** items related to the implementation, such as time and budget to make the ad.

After filling the inputs of information into the template, the final step is to give clear prompts. The prompts will clarify the role that the AI is playing and the task it is going to carry out. Then, prompts guide the AI to create the output of ad script with an expected format. AI should be given instructions about how to use the settings provided in the template. The prompts connect the designed items of the template to the output of a narrative ad script. The prompts also include instructions about the format of the output, including certain content to be generated and the sequence of required content. The following is an example of prompts:

You are a senior short-video creator. You will create a TikTok advertisement for a brand. Based on the requirements in the “Ad script setting”, you need to write a creative and complete script:

- i. Collect information about the “Brand”, such as main products and brand statements;
- ii. Design an ad storyline according to “Inspiration”, “Keyword” and “Content category”;
- iii. The ad story should be attractive to “Target consumer”, and the presented form should be in line with the “Blogger style”;
- iv. The length of ad is limited to “Time”, and the production cost should be within the “Budget”;
- v. Ensure there is sufficient brand exposure time in the ad, and place the brand at appropriate positions in the video.

You should output the result as the following format:

[Title]: The title of the ad

[Core Content]: Summarize the core story of the ad

[Brand Association]: What words are associated with the brand to impress the target consumers (e.g., Nike, Victory)

[Storyline]: A complete and detailed script for the ad video – precise to seconds for each scene

[Production Cycle]: The unit is in days

[Materials]: Specific equipment and resources needed to produce the ad.

If users find the initial output unsatisfactory, they may tune their inputs with the template and ask the AI to re-generate. Since the template and the prompts both include several items serving unique aspects, users can just modify their inputs with corresponding items based on their evaluation on related parts of the output.

6.4 Leveraging AI Chatbots during Purchase

AI chatbots have significantly enhanced customer connection, operational flow and sales performance in the rapidly changing e-commerce sector (Li &

Wang, 2023). Powered by NLP and machine learning, these AI conversational agents enable companies to provide service at any time, tailored product suggestions and swift order execution. Understanding how to use AI chatbots is an important skill for students in business school to face today's digital business environment. This part describes an extensive teaching method centered on AI chatbot usage in connection with the stage of "During Purchase" (Han, 2021). By integrating knowledge from theory, thorough practical activities and lessons in ethics, educators empower students to create, introduce and review chatbots in e-commerce, supporting Macau's "1+4" diversification strategy. The "During Purchase" stage represents an important point in the customer experience. They weigh their options, compare prices for different options and search for support to finalize their choices. Customer abandonment of the shopping process arises when there are delays, confusion or insufficient support. AI chatbots along with agentic marketing are presented as solutions to these challenges, as they supply real-time help, tailored analyses and encouragement to help customers act with confidence (Acharya et al., 2025). In this chapter, we illustrate methods for students to utilize these technologies to boost purchase optimization.

6.4.1 The Role of AI Chatbots in Real-Time Purchase Support

AI chatbots are changing how people purchase products by working as always active virtual assistants powered by NLP and machine learning. They quickly answer customer questions, gathering specifications, pricing and inventory status, for example, replying to, "When and from where will the product be shipped?" Using information from users' browsing paths and prior orders, chatbots personalize shopping by proposing additional items – such as presenting camera lens alongside a camera sale. Besides, they make it easier for customers to decide by offering comparison tools and using social proof, like showing reviews and ratings, for example, "98% of other buyers recommend this". Because chatbots facilitate thousands of complex conversations at once, they deliver highly efficient and scalable service, making sure customer support is continuous and faster than with human-only systems.

Examples from real world show how AI chatbots can greatly improve e-commerce. For example, Sephora's chatbots on Facebook Messenger help users with reservations and allow them to try on makeup online (Leung et al., 2020), improving the level of personalization in customer engagement. The chatbot developed by H&M promotes interactive shopping by offering suggestions and style advice that cater to what each user likes (A. Kumar et al., 2024). Louis Vuitton's NLP-based chatbot delivers product details, locates stores and supplies customer support, working naturally alongside human advisors (Qi et al., 2025). These cases present optimal strategies for clear conversation, personalization and e-commerce platform use, guiding students in their academic work.

Thanks to the quick growth of AI agents, LLMs prove much stronger than traditional rule-based chatbots. Given that these models can work with natural language more skillfully, they make interactions much more complex and compelling. In consequence, students in business now benefit from a diverse range of learning resources. Such tools do more than introduce AI concepts; they also develop skills that are now important for today's job market. Use of these resources and code-free tools allows students to better understand the role of AI in customer service, marketing and other areas of business, which is crucial for their future careers.

6.4.2 Tools and Software

6.4.2.1 E-commerce Systems

E-commerce website creation relies on a set of tools designed to help manage, develop and seamlessly connect with other external systems. A basic tool used is XAMPP, which is a free, open-source bundle that facilitates the creation of a local server for designing and testing web-based products. Relying on Apache, MySQL, PHP and Perl, XAMPP lets developers develop and test a WordPress e-commerce site with WooCommerce on a local server before taking it live. Having a local testing environment permits the evaluation of product databases, the site's functions and custom features, making it secure to make changes without live site impact. Due to its uncomplicated setup process for Windows, macOS and Linux, XAMPP gives developers the ability to efficiently try and perfect their e-commerce projects. To build e-commerce websites professionally, WordPress acts as the foundation, taking care of product listings, blog updates and customer interactions. Because of its extensive variety in themes and plugins, businesses are able to build attractive and user-friendly online stores. When empowered by e-commerce plugins like WooCommerce, WordPress is converted into a versatile platform for businesses of all sizes. WordPress installation on a developer's local server through XAMPP or on a live hosting service is the first step, followed by theme selection for a powerful e-commerce store.

Businesses of all sizes can make use of WooCommerce because it gives them complete tools for handling products, order processing, payment options and shipping within WordPress. For physical goods, digital downloads or variable products, WooCommerce allows store owners to select from popular payment gateways like Stripe and PayPal, and shipping options including USPS and FedEx. With the help of additional plugins, WooCommerce can be expanded to feature analytics, marketing instruments and SEO improvements. WooCommerce setup is simple – once the plugin is installed, students can navigate through the setup process to tailor their store settings, then start adding products, resulting in a fully working e-commerce online store.

Additionally, access to external services on an e-commerce site is possible by using APIs, which links and communicates between different software

systems. APIs integrate platforms like WooCommerce with external services, for example payment providers, shipping organizations and CRM systems, to support real-time transaction processing and continuous data exchange in e-commerce. As part of a powerful e-commerce development environment, XAMPP, WordPress, WooCommerce and APIs help build, test and grow online stores, enabling students to have a polished and user-friendly shopping platform for learning and research.

6.4.2.2 *Chat Interface and Large Language Models*

Students nowadays have several powerful and accessible toolsets of LLMs for creating AI chatbots that assist customers during online purchases. Previous platforms such as Dialogflow and Microsoft Bot Framework struggled with advanced NLP settings and the complexities of natural speech, unlike modern LLMs, which achieve exceptional accuracy and context in understanding customer inquiries in multiple languages. When students link LLMs to e-commerce platforms, they create chatbots that help shoppers customize product suggestions, respond to inventory questions and guide purchase steps.

Well-known models like DeepSeek, Qwen and Baichuan help chatbots handle varied incoming queries and generate natural-sounding replies, positioning them as optimal choices for supporting customers in real time. Students have the opportunity to hook these LLMs up to e-commerce product data via APIs or user-friendly integration tools, building a fluid interface that strengthens customer support and teaches AI techniques. The ease-of-use of LLMs gives students the chance to devote effort to crafting user-friendly chat interfaces instead of overcoming the obstacles of old NLP systems. Students are able to build real-time chatbot interactions with customers by linking LLMs such as DeepSeek or Qwen to the API of an e-commerce platform, enabling the chatbot to access and respond with inventory or order data. For example, a chatbot can process a question such as “I’m looking for a gift under \$50 – what do you suggest?” by accessing the product database and replying with a list of options, each with a description and a link to buy.

Students are able to work with these integrations in a development setting, improving the chatbot’s conversation process to deliver a clear and straightforward user interface. They are not only introduced to using LLMs in real situations but also develop API integration and AI customer engagement skills that support their ability to deliver e-commerce innovations.

6.4.2.3 *Agentic Workflow*

Agentic workflows, such as Coze and Dify, revolutionize AI application building by allowing students to develop sophisticated chatbots to support real-time purchases in e-commerce. Diverging from rule-based systems, agentic workflows permit AI agents to engage in self-driven reasoning, decision-making and task execution by dynamically calling on suitable tools. Coze is highly

user-friendly, which supports the combination of workflow management, NLP and plugin capabilities through their easy-to-use interfaces. The tools facilitate students' ability to connect LLMs such as DeepSeek and Qwen to e-commerce APIs, allowing the creation of chatbots that can understand customer questions, verify items and reply in a personalized fashion. Through agentic workflows, students can acquire skills for creating AI that meets customers' needs and learns to merge logical reasoning in AI with operations in external systems.

Coze supports a range of workflow functionalities that facilitate straightforward creation of e-commerce AI chatbots. Visually, users can plan how the chatbot outputs are generated using Coze's workflow, where nodes take care of steps such as parsing user input, calling LLMs and using tools. For instance, Coze allows users to create workflow functions for LLMs, thus letting a chatbot execute actions such as reaching out to an e-commerce API to verify item availability if a customer asks, "Is this item in stock?" Function calling relates user inputs with needed tools (e.g., order details lookup), enabling continued polishing of replies according to each tool's output. In both settings, automated loops let the LLM evaluate user requests, access appropriate tools and revise context until the task is finished, making them suitable for students to test interactive, multi-phase chatbot processes in e-commerce.

Coze's plugin ecosystem notably advances their agentic workflows by giving students tools that can be used to improve chatbot abilities. In Coze, pre-built plugins for web searches, data processing and image generation are available in a marketplace, and these can be incorporated into workflows to make chatbots, for instance, retrieving news and social media data from external websites. When students combine these plugins with LLMs and e-commerce systems, they are able to make chatbots that can both have natural conversations and take real-world actions, connecting AI to e-commerce applications.

6.4.3 Hands-On Practice and Projects

The section illustrates how students can leverage the available tools to create innovative solutions for real-world business problems. With the help of AI agentic platforms such as Coze, students may learn practical skills in creating chatbot solutions tailored to real-world e-commerce tasks, such as giving tailored product suggestions, improving restaurant customer service and generating product posters.

Giving tailored product suggestions: Coze's visual workflow editor allows a student to set up a chatbot to find and recommend products after interpreting a customer query. The workflow activates the LLM to interpret the user's request, calls an e-commerce API to collect suitable product data and deploys a recommendation that suggests products by considering user profile and transactional data. Students learn to incorporate APIs, manage LLM-driven processes and launch a chat widget through this project,

which addresses practical customer decision-making needs and sharpens their technical abilities.

Improving restaurant customer service: Students can also utilize Coze's workflow capabilities for designing a chatbot that makes dining experiences smoother, especially by addressing problems such as wrong orders and lengthy waits. Students are able to develop workflows that respond to a request such as "Can you recommend a vegan dish?" by utilizing function calling to access a restaurant's menu API and present specific suggestions. The chatbot is able to handle bookings and data collection, letting students find out reasons for gaps, such as common concerns about service delays. Students achieve more polished and efficient conversations by evaluating the chatbot with artificial queries and adjusting its responses using Coze's workflow logs. This practical activity cultivates expertise in designing agentic workflows and working with APIs, and additionally supports critical thinking when students propose analytics-based solutions, including automated updates for orders, to boost customer satisfaction in the restaurant industry.

Generating product posters: Besides generating texts, students may address the problem of slow, manual design processes by using Coze's workflows in concert with LLMs and image generation plugins to automate marketing content generation. A task for a student is designing a workflow that accepts a product description, creates slogan text using an LLM and then forwards this to several plugins through a workflow for visuals. It consists of nodes for using LLMs in copywriting, calling APIs to obtain product visuals from an e-commerce site and employing a plugin to arrange the poster layout. Students test what the system produces, adjust the LLM's tone to align better with the brand and write about the conflicts between automated workflows and creative autonomy.

By doing these projects, students learn how to combine several AI tools to resolve problems within marketing. Students strengthen their awareness of agentic technologies as they think about their projects involving recommendations, restaurant operations and poster design, which prepares them for advancement in e-commerce and related industries.

6.4.4 Ethical Considerations and Limitations

Students learning to build e-commerce AI chatbots should be reminded of ethical standards and limitations to guarantee reputable and dependable results. Students must realize that flawed data during training can make chatbots react inaccurately or with bias (Xue et al., 2024), which makes it essential to double-check their outputs in tasks that need reliability, for instance, pricing or customer communication. They should also make data privacy a top concern, since e-commerce chatbots interact with customers' confidential information, which must be safeguarded in accordance with rules such as GDPR.

Students should also value human review, because unresolved difficulties can only be handled properly by people, and they should set up systems to inform users when they are speaking with AI for trustworthiness. By embedding these elements into their practical work with tools like Coze, students are enabled to generate groundbreaking solutions, which fulfill ethical expectations and respond to actual e-commerce difficulties.

6.5 Agentic AI for Customer Relationship Management

6.5.1 The New Trend of Agentic AI

While generative AI has been a hot topic in recent years, the AI evolution has grabbed people's attention to the rise of agentic AI. The development of agentic AI is changing business and marketing operations (Kshetri, 2025). Agentic AI can learn, infer and act by itself without human involvement. The emergence of agentic AI makes AI more powerful as AI agents are able to address complex, multi-step tasks in collaborative scenarios. AI agents can implement users' requirements automatically with adapted workflows. With the power of LLMs and basic reinforcement learning technologies, agentic AI can perceive and understand the context of the tasks. In addition, it has the ability to reason and plan how to solve the problems and respond to users with logical answers. Different from giving instructions toward a single LLM or a specific AI agent, agentic AI enhances task management capability through using tools and taking actions autonomously. Marketers can build various agentic AI systems to assist themselves with predefined workflows and frameworks, adding efficiency to marketing activities. Agentic AI is useful to handle complex marketing tasks, such as tracking marketing trends, getting customer insights, generating social media posts and planning marketing strategies.

6.5.2 Customer Relationship Management via Comment Replies

This section is suitable for courses such as customer relationship management (CRM) or related modules in the domain of digital marketing. The aim is to enhance students' understanding of how agentic AI can be used for long-term customer relationships. CRM is a marketing-led approach to building and sustaining long-term business with customers. It is a process to transform non-customers into actual customers and then loyal customers. Lifetime value is emphasized under the philosophy of CRM. Loyal customers make more orders and spend more than other customer segments. Keeping a small portion of loyal customers may generate a larger part of incremental profits. In the opposite, high churn rates may impair a company's profitability. It could be expensive and inefficient to acquire new customers to maintain business growth. Therefore, how to maintain customer relationships becomes a vital issue to firms.

We use CRM as the context to illustrate the application of agentic AI. According to customer lifecycle, there are four stages: 1) select target customers; 2) acquire customers; 3) retain the most valuable customers and make them come back again for repurchase, which demonstrates a long-term loyal relationship; and 4) extend the range and depth of products that customers purchase. In this section, we take the retention stage as the context. We focus on customer comment reply to management, for which agentic AI can play an important role. The touchpoint happens after a customer buys a product and leaves a comment. We remind students that, in this post-purchase engagement, an excellent response from the seller is crucial for retention.

Word-of-mouth has twofold meanings. As actual users' real opinions, it influences peer consumers' purchase decisions. While consumers give comments on social media or e-commerce platforms, their voice becomes an informal channel to spread product information and evaluations. Moreover, consumer comments can reflect their attitudes, satisfaction and behavioral intentions. Therefore, companies should respond to customers in order to maintain relationships and enhance customer satisfaction and loyalty. Effectively replying to consumers' online reviews can help strengthen brand-consumer connection and stimulate consumers' positive emotional experiences, which in turn will increase repurchase.

6.5.3 *Agentic AI in CRM-Oriented Comment Management*

The traditional approach relies on human customer service to manage customer comments manually. But this manual mode cannot last. Employees have limited working hours, and companies have limited budget for labor hours. Yet consumers may leave comments 24/7. With the growth of a business, comments may increase exponentially. There is no way for employees to reply to every comment manually. Therefore, it is necessary to transform the human-involvement mode to the AI-autonomy mode. However, AI can operate around the clock, providing instant responses at any time. This can minimize customers' waiting time when they indicate problems in their comment and require problem-solving. Beyond technological issues, students should note that excellent comment reply management should involve a mindset of CRM. It is not just replying to a comment but maintaining a long-term relationship with the customer.

In such a context, we provide an example and practice to train students with the use of agentic AI. We will recommend AI tools, design a template for comment reply management and set prompts for the AI to generate responses and reply automatically.

We use *Feishu* as an example to show how AI can help post-purchase customer service with their comments. As Table 6.2 shows, we customize a template, build a workflow and set prompts to guide AI to implement the task automatically. The workflow includes three steps. The first is to classify the problem according to the content of a customer comment. AI will give

Table 6.2 A template and workflow for comment reply to management

<i>Workflow</i>	<i>Prompts</i>
Classification	Identify problems from reviews and match appropriate tags
Sentiment analysis	Identify sentiment polarity of reviews: “positive”/“negative”/“neutral”
Automated reply	<p>You are a post-sales customer service whose job is to maintain long-term brand-customer relationships.</p> <p>To reply to consumers’ reviews, you should:</p> <ol style="list-style-type: none"> 1) Generate replies in the tone consistent with the brand style 2) Respond to consumer requests 3) Emotional engagement with consumers based on their emotional disclosure in comments 4) Motivate consumers to repurchase

different labels to different problems. This can help data sorting. As a second step, AI will conduct a sentiment analysis to identify the valence of the customers’ emotions. This is foundation for emotional communication with the customer, which can make communication more human-like and the relationship more personalized. Finally, AI is guided to generate a CRM-oriented reply and implement the communication task automatically.

In our design of the template and prompts, personalized communication, emotional interaction and CRM orientation are highlighted. And these points are emphasized in the lecture to students. As Table 6.2 shows, the prompts for AI’s responses represent the above philosophy.

- The AI is designated a role as a post-sales customer service. And the goal of its job is defined in a way so as to maintain long-term brand-customer relationship.
- The tone of any reply should be consistent with the brand style. A more detailed prompt may refer to brand personality or brand image as the style.
- Based on sentiment analysis, AI can detect emotions conveyed in a comment. And the AI is asked to communicate with consumers in an emotional way. Emotional expressions are seen as a characteristic of human-like communication. And it has been found that emotional communication in social interactions can enhance relational bonds. Thus, this setting can reduce the feeling of machines and improve brand-customer relationships.
- Last and most importantly, retention is the focus of the entire project. Repurchase is the key indicator to demonstrate the achievement of retention. Therefore, the AI is asked to take various tactics to motivate repurchase during the comment reply.

To demonstrate the above template and prompts, instructors may use real examples of comments to show how the AI will respond. Examples can be collected from e-commerce platforms or any brand online stores. Yet, for better

class engagement, we recommend asking students for their actual comments. Students may share their actual experience and real opinions behind the comments posted. And they can be invited to evaluate the replies made by the AI. This interactive design of class participation will enhance the performance of teaching and learning.

The following is a real sample of comment from a student's actual experience. In the class, we used it to show how agentic AI performed. The comment was made after the student ordered a cup of hot milk tea from a beverage brand:

The delivery was super slow. I ordered ages ago, and it finally arrived cold.

To improve class engagement, instructors can discuss with students on the comment. Students may analyze the content of the comment and then propose a suitable reply. Following the template, students are guided to categorize the problem, identify any request raised by the customer and analyze the sentiment. For the reply, students should consider the four points highlighted in the template. Students may search for information about the brand style to make the tone of response fit the brand personality or image. And instructors can ask students about their ideas on how to motivate the customer to purchase again. Even though it is a negative event when the brand encounters a negative comment, the mindset of CRM reminds them to turn it to an opportunity to strengthen the brand-customer relationship.

After the discussion, students may have gained knowledge of integrating the idea of CRM in comment reply to management. Then, instructors can show the reply made by AI.

☹️ Sorry for keeping you waiting! The recent drop in temperature has caused a surge in orders, which extended the delivery time. We have taken note of your feedback and will strive to improve.

As this autumn gets chillier🍂, our new-launched, seasonal limited hot fruit tea can bring you warmth like sunshine☀️😊 As an appreciation for your understanding, we offer you a compensation of a 5-yuan coupon, which can be used at your next purchase. If you like our products, don't forget to join our livestream every Wednesday night for "Flash Delivery Card" and more premium bonus! Click this link . . . 🌟

Thank you again for your support! 😊

Based on the template and prompts, the AI also provides evaluation of the reply:

1. Apology and explanation: The reply starts with a sincere apology for the slow delivery and explains the reason. It is acknowledged that the customer's feedback is very important. The brand has taken notes and will try best to improve.

2. Compensation and CRM: The brand provides monetary compensation after the apology. The compensated coupon is for next purchase, which is aligned with the goal of CRM. And a product is recommended for the next purchase. Moreover, a promotion of livestream is added, with a bonus of “Flash Delivery Card” that is related to the complaint. Thus, the complaint about the delivery issue is transformed into an opportunity of promoting a seasonal product.
3. Emotional interaction: The warm expression with the recommended hot tea and a sunshine emoji hedges the negative emotion of the complaint and the chilly weather.
4. Brand style: The warm and friendly tone aligns with the brand style.

6.6 Conclusion

Digital technology and AI are key directions within the economic diversification strategy proposed by the Macau Government – supporting tourism and leisure as its core industry together with big health, modern finance, high-tech, conventions and exhibitions. To train talents and support such a transformation, higher education institutions in Macau are incorporating digital technology and AI together with modern educational techniques into their business programs. This chapter illustrates how digital technology and AI are integrated into curricula including marketing, e-commerce and decision analysis. Especially, we focus on human-AI co-creation, which utilizes generative and agentic AI tools to solve various problems. Agentic marketing is an emerging and advanced approach that emphasizes AI-powered automation in the realm of marketing. This chapter particularly demonstrates how agentic AI optimizes the effectiveness of two selected scenarios in marketing communications: narrative content co-creation and brand-relation-personalized responses. Collaborating with AI, students can design narrative content marketing and conduct decision analysis based on designated brand personalities, selling points, tones, marketing goals and target segments. This enables brands to attract and convert customers more effectively. In post-purchase engagement, agentic AI can help marketers analyze customer comments and craft personalized responses automatically. For instance, to deal with complaints, students can apply more advanced techniques using agentic AI. Besides compensation types, there are additional options of inputs by integrating brand value propositions, mentions of individual complaint points and particular customer-relation-management goals.

For instructors from different countries, they may apply our template and prompts in different scenarios with different brands and marketing goals. They are simple and easy to use. Instructors can manage teaching with them more efficiently, and students are able to complete tasks without coding skills. Hands-on assignments offer students valuable opportunities to understand customer needs within real-world business scenarios, thus enabling them to adopt flexible digital technologies and AI tools for practical

purposes such as customized product recommendations, customer service and poster generation for goods. This all-encompassing method, covering extensive use cases, skillful prompting and realistic projects, suits Macau's "1+4" strategy for economic diversification, giving students the skills to excel in the digital economy and contribute to technological and economic transformation.

References

- Acharya, D. B., Kuppan, K., & Divya, B. (2025). Agentic AI: Autonomous intelligence for complex goals – A comprehensive survey. *IEEE Access*, *13*, 18912–18936.
- Celhay, F., & Luffarelli, J. (2024). Competent or sad blue? Lively or aggressive red? Why, how, and when background color shapes the meanings of logo hues. *Journal of Consumer Research*, *51*(4), 820–844.
- Chaffey, D., & Ellis-Chadwick, F. (2022). *Digital marketing* (8th ed.). London: Pearson.
- Han, M. C. (2021). The impact of anthropomorphism on consumers' purchase decision in chatbot commerce. *Journal of Internet Commerce*, *20*(1), 46–65.
- Hartmann, J., Exner, Y., & Domdey, S. (2025). The power of generative marketing: Can generative AI create superhuman visual marketing content? *International Journal of Research in Marketing*, *42*(1), 13–31.
- Hoek, J., & Gendall, P. (2010). Colors, brands, and trademarks: The marketing (and legal) problems of establishing distinctiveness. *Journal of Advertising Research*, *50*(3), 316–322.
- Kshetri, N. (2025). From predictive and generative to agentic AI: Shaping the future of marketing operations and strategies. *Computer*, *58*(4), 121–129.
- Kshetri, N., Dwivedi, Y. K., Davenport, T. H., & Panteli, N. (2024). Generative artificial intelligence in marketing: Applications, opportunities, challenges, and research agenda. *International Journal of Information Management*, *75*, 102716.
- Kumar, A., Gupta, N., & Bapat, G. (2024). Who is making the decisions? How retail managers can use the power of ChatGPT. *Journal of Business Strategy*, *45*(3), 161–169.
- Kumar, V., Ashraf, A. R., & Nadeem, W. (2024). AI-powered marketing: What, where, and how? *International Journal of Information Management*, *77*, 102783.
- Kumar, V., Ramachandran, D., & Kumar, B. (2021). Influence of new-age technologies on marketing: A research agenda. *Journal of Business Research*, *125*, 864–877.
- Leung, C. H., & Yan Chan, W. T. (2020). Retail chatbots: The challenges and opportunities of conversational commerce. *Journal of Digital & Social Media Marketing*, *8*(1), 68–84.
- Li, M., & Wang, R. (2023). Chatbots in e-commerce: The effect of chatbot language style on customers' continuance usage intention and attitude toward brand. *Journal of Retailing and Consumer Services*, *71*, 103209.
- Marshall, A. (2025). *Color psychology: The logo color tricks used by top companies – and how to design your own*. Retrieved August 10, 2025, from <https://www.canva.com/logos/color-psychology-the-logo-color-tricks-used-by-top-companies/>
- Patel, N. (2025). *True colors – Breakdown of color preferences by gender*. Retrieved August 10, 2025, from <https://neilpatel.com/blog/gender-and-color/>
- Phillips, B. J., & McQuarrie, E. F. (2010). Narrative and persuasion in fashion advertising. *Journal of Consumer Research*, *37*(3), 368–392.
- Qi, L., Ko, E., & Cho, M. (2025). AI chatbots with visual search: Impact on luxury fashion shopping behavior. *Journal of Global Scholars of Marketing Science*, *35*(2), 1–19.

- Rusthollkarhu, S., Toukola, S., Aarikka-Stenroos, L., & Mahlamäki, T. (2022). Managing B2B customer journeys in digital era: Four management activities with artificial intelligence-empowered tools. *Industrial Marketing Management*, *104*, 241–257.
- Saini, M., & Dudkiewicz, L. (2025). *40+ logo statistics that every business should know*. Retrieved August 10, 2025, from <https://cropink.com/logo-statistics>
- Singh, S. (2006). Impact of color on marketing. *Management Decision*, *44*(6), 783–789.
- Sun, Y., Chen, J., & Sundar, S. S. (2024). Chatbot ads with a human touch: A test of anthropomorphism, interactivity, and narrativity. *Journal of Business Research*, *172*, 114403.
- Xue, J., Wang, Y. C., Wei, C., Liu, X., Woo, J., & Kuo, C. C. J. (2024). Bias and fairness in chatbots: An overview. *APSIPA Transactions on Signal and Information Processing*, *13*(2), 1–44.