

RESEARCH ARTICLE

The use of Marketing Technology in Stock Firms Based on Insourcing and Outsourcing Strategy

Chaknarin Kongcharoen¹  and Thanyalak Mueangkhrot^{2,*} 

¹Faculty of Science and Engineering, Kasetsart University, Sakon Nakhon 47000, Thailand

²Faculty of Liberal Arts and Management Science, Kasetsart University, Sakon Nakhon 47000, Thailand

*Corresponding author: Thanyalak Mueangkhrot, tunyalak.m@ku.th

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Abstract

Marketing technology (MarTech) is becoming increasingly important for businesses and marketers. Firms use MarTech tools and technologies to support marketing activities. This study attempts to understand how marketing technology is used in firms and to explore research evidence regarding how MarTech tools enhance marketing functions. Data were collected from 100 firms listed on the Stock Exchange of Thailand. The data were analyzed to classify 53 MarTech tools into 22 MarTech categories. The study classifies MarTech based on insourcing–outsourcing information technology and the marketing mix framework. The results identify three dimensions of MarTech tools: insourcing, outsourcing, and hybrid sourcing. Finally, the study provides recommendations and future research directions for the adoption of marketing technology practices. This paper provides a comprehensive literature review and proposes a classification of marketing technology based on an insourcing–outsourcing perspective.

1. Introduction

The COVID-19 pandemic has accelerated digital transformation and encouraged firms to integrate digital technologies into business operations. As a result, companies have adapted their customer management practices to respond more effectively to the digital economy (Sharma et al., 2025). Consequently, the role of information technology in marketing has become an increasingly important topic of discussion among both academics and practitioners. The application of information technology to marketing activities is commonly referred to as Marketing Technology (MarTech). MarTech is defined as “the tools and platforms that marketing organizations require to successfully achieve their goals” (Worthington, 2021).

The marketing technology industry has experienced remarkable growth over the past decade. The MarTech landscape expanded from approximately 2,000 vendors in 2015 (Brinker, 2015) to more than 5,000 vendors by 2020. Recent developments indicate a continuing growth trend driven by advances in artificial intelligence, data analytics, and automation technologies. These innovations are increasingly incorporated into

marketing strategies to improve customer experiences and support business growth (Sripathi, 2024). In addition, Verma (2025) reported that digital marketing technologies and tools can significantly improve marketing effectiveness by helping firms attract customers, increase sales, and achieve marketing objectives. The rapid expansion of the market has also intensified competition among marketing technology providers, including platforms such as Snapchat, Salesforce Pardot, Sitecore, DoubleClick, Google AdWords, and various marketing automation solutions (MarTech, 2025).

Recent studies have also examined how firms acquire and manage marketing technologies. For example, Meshko and Mamedova (2024) investigated digital marketing outsourcing strategies and highlighted the growing importance of external technology providers. Firms differ substantially in their sourcing decisions. Some organizations adopt insourcing strategies by developing MarTech systems internally to maintain customization, flexibility, and control over organizational data. Others prefer outsourcing strategies that rely on specialized vendors to reduce costs and gain access to advanced technological capabilities. The choice between insourcing and outsourcing is often influenced by organizational

resources, strategic priorities, technological capabilities, and the need for operational flexibility.

A review of the literature indicates that marketing technology has been examined from multiple business perspectives. Many studies focus on publicly listed firms because they are generally considered credible organizations and provide accessible business information. For instance, Brady et al. (2002) proposed a framework for integrating information technology into marketing practice and discussed issues related to technology assimilation in marketing functions. In the organizational marketing context, Kalaignanam and Varadarajan (2012) investigated customer relationship management technologies and examined how offshore outsourcing influences market-based performance outcomes. More recently, Gupta and Goel (2024) explored the role of marketing automation technologies in customer acquisition. Although previous studies have recognized the importance of sourcing decisions in marketing technology adoption, empirical evidence remains limited. Marketing technologies have transformed business models and enabled firms to enhance marketing effectiveness while improving operational efficiency.

Despite the growing adoption of marketing technologies, limited empirical evidence exists regarding how firms utilize MarTech tools under different sourcing strategies. Most prior studies have focused on specific technologies, digital marketing practices, or outsourcing decisions independently, while relatively little attention has been given to understanding the relationship between MarTech adoption and sourcing approaches. This gap in the literature suggests a need for further investigation into how firms strategically employ marketing technologies through insourcing and outsourcing arrangements.

The primary objective of this study is to review recent developments in the literature on insourcing and outsourcing strategies for marketing technology and to provide an initial examination of MarTech adoption through an analysis of marketing technology tools used by firms. Specifically, this study investigates the types of marketing technologies employed by organizations and examines their utilization from the perspective of sourcing strategies. The findings are expected to contribute to a better understanding of MarTech adoption patterns and provide insights for both researchers and practitioners seeking to develop effective marketing technology strategies.

The remainder of this paper is organized as follows. Section 2 reviews the literature on marketing technology, including major categories of MarTech tools and sourcing strategies for information technology. Section 3 describes the data collection process. Sections 4 and 5 present the results and discusses the use of marketing technology tools under different sourcing strategies. Finally, Section 6 concludes the study and suggests directions for future research.

2. Literature review

2.1 Types of MarTech

MarTech functions as a highly complex ecosystem of platforms, applications, and application programming interfaces (APIs). Gudema (2014) reported that firms seek to employ marketing technologies that can generate leads, opportunities, and revenue at a minimum cost. Thus, many firms expect to increase their investment in marketing technologies such as e-commerce, website analytics, social media, and customer data analytics. From this perspective, marketing technology can be classified into seven groups (Gudema, 2014).

1. **Analytics** – The practice of measuring, analyzing, and evaluating marketing performance, including channels, technologies, advertisements, and campaigns.
2. **Conversion Optimization** – The practice of increasing the percentage of website visitors who convert into customers or complete a desired action on a webpage.
3. **Email Marketing** – Email service tools used for sending additional information and valuable content tailored to an individual's interests.
4. **Search Engine Marketing** – A form of internet marketing that promotes websites by improving their visibility in search engine results through both paid and organic search strategies.
5. **Remarketing** – An online marketing technique that enables advertisers to reach visitors who have previously visited a website. After visitors leave the website, advertisements are displayed on other websites they subsequently visit.
6. **Mobile** – Techniques for creating mobile-friendly websites using responsive design, which automatically adjusts the display to fit the device on which the website is viewed.
7. **Marketing Automation** – A technology that integrates analytics and online forms to track consumer behavior and personalize website content. Marketing automation can manage email campaigns, facilitate sales and marketing alignment through lead scoring, automate alerts to sales personnel, and utilize data from CRM systems and third-party sources to support marketing activities.

Whereas the aforementioned classification principally focuses on platform systems and operational applications, another classification system adopts a more cluster-based approach by grouping key vendors within a multi-platform environment. From this perspective, marketing technology can be categorized into six groups (Brinker, 2015).

1. **Advertising and Promotion** – Multi-platform advertising and promotional tools for mobile and web environments, including mobile marketing, display and programmatic advertising, search and social advertising, native/content advertising, video advertising, print media, and public relations.
2. **Content and Experience** – Tools designed to create and enhance customer experiences, including mobile applications, email marketing, interactive content, video marketing, content marketing, optimization, personalization and testing, digital asset management (DAM), marketing resource management (MRM), search engine optimization (SEO), marketing automation, campaign and lead management, content management systems (CMS), and web experience management.
3. **Social and Relationships** – Tools that support customer engagement and social interaction, including call analytics and management, account-based marketing (ABM), events, meetings and webinars, social media marketing and monitoring, advocacy, loyalty and referral programs, influencer management, online communities and reviews, customer feedback and chat systems, customer experience management, and customer relationship management (CRM).
4. **Commerce and Sales** – Tools that support commercial and sales activities, including retail marketing, distribution partner management, global marketing, sales automation, sales enablement and intelligence, affiliate marketing, and e-commerce platforms and shopping carts.
5. **Data** – Technologies for collecting, integrating, and analyzing marketing data, including audience intelligence, marketing analytics, performance measurement and attribution, mobile analytics, website analytics, dashboards and data visualization, business intelligence, customer intelligence, data science, integration platform as a service (iPaaS), cloud and data integration, tag management, data management platforms (DMP), predictive analytics, and CRM/customer data platforms.
6. **Management** – Technologies that support organizational operations, including talent management, product management, budgeting and finance, collaboration tools, project and workflow management, agile and lean management, and vendor analysis.

2.2 Tools for Marketing Solutions

Marketing solutions are tools that help firms develop and implement marketing strategies through customized concepts and information technology solutions.

Based on their functionality, these tools can be classified into two groups: social network tools (i.e., tools utilized to make connections with friends, family members, classmates, customers, and clients through internet-based platforms) and direct network tools (i.e., tools used to deliver communications directly to customers on either a personal or mass-media basis). The purpose of a marketing solution is generally determined by the type of network employed, whether social or direct.

Social Network: Some examples are as follows:

- **Sina Weibo Blog** – A marketing microblog, often referred to as the Twitter of China. This platform helps users understand current Chinese culture and society. It also enhances brand visibility and fosters audience engagement, thereby strengthening brand recognition and customer relationships (Gong et al., 2017).
- **Salesforce** – A marketing automation platform that leverages the business potential of social networking by focusing on customer acquisition. Salesforce provides businesses with tools for managing cases and tasks, along with systems that automatically direct and escalate key events. The Salesforce customer portal enables users to track cases and includes social networking plugins, analytical tools, email alerts, Google search capabilities, and access to customer entitlements and contracts (Moskalenko et al., 2023).
- **WeChat** – A mobile voice and text communication application that incorporates social networking features such as friend discovery. Users can communicate instantly through voice messages, text messages, and images (Zhang, 2022).
- **LINE** – A cross-platform communication service and application developed by Naver. Its basic functionality allows users to send text messages and make free calls with other users who have the application installed on their smartphones. Other examples of social networking marketing technology tools include YouTube, Instagram, Twitter, LinkedIn, Skype, and Pinterest.

Direct Network: Some examples are as follows: MailChimp, Constant Contact, and marketing automation programs.

- **Email** – A communication tool used to send valuable content tailored to an individual's interests. Email marketing is highly effective because it allows firms to maintain communication with customers and prospects who have expressed interest in receiving information.
- **GroupMail** – An email marketing software application used for creating and distributing email newsletters, promoting products, and strengthening customer relationships (Bailoul et al., 2025).

- **Yahoo Zimbra (Cloud Email)** – A next-generation collaborative server that provides organizations with enhanced flexibility and simplicity. It integrates email, contacts, calendars, document sharing, and document management, while also supporting mobility and desktop synchronization across multiple devices (Madare, 2025).
- **HubSpot** – A marketing automation platform for inbound marketing and sales that helps organizations attract visitors, convert leads, and acquire customers. The platform supports content creation, search engine optimization, social media sharing, landing pages, calls to action, personalized email campaigns, and personalized websites. Other examples of direct marketing technology tools include radio, search engine marketing, e-magazines, digital television, television commercials (TVC), banner advertisements, newspapers, Photoshop, Illustrator, InDesign, and Acrobat. HubSpot serves as a growth-oriented tool that supports customer acquisition and marketing effectiveness (Steenburgh et al., 2009).

Although the list of marketing technology tools presented here is not exhaustive, and new marketing technologies continue to emerge, it provides a useful overview of the variety of tools available for different marketing situations. Another important development in marketing technology is the adoption of cloud-based solutions, which support marketing activities through flexible technology services. In many cases, firms cannot afford complex and costly infrastructure investments. Cloud solutions allow organizations to distribute costs over a longer period through resource rental arrangements. The following section discusses the use of marketing technology tools in business operations.

2.3 Prior Research Concerning Insourcing and Outsourcing Marketing Technology

In the marketing context, marketing technology refers to the set of tools and platforms that marketing and sales organizations require to accomplish their objectives effectively. Previous studies have shown that the adoption of information technology in marketing can enhance business value (Plangger et al., 2022; Brady et al., 2002). Graesch et al. (2021) emphasized the importance of information technology for effective marketing strategies. Similarly, Brodie et al. (2007) suggested that e-marketing technologies extend beyond internet-based advertising and communication tools to include technologies that support customer relationship management, sales activities, customer support, marketing research, and marketing planning.

In addition, Biemans (2023) investigated the impact of digital tools on sales–marketing interactions and perceptions. The study found that the use of digital tools such as Teams, Zoom, and WhatsApp in B2B firms

during the COVID-19 pandemic significantly influenced sales–marketing interactions and perceptions. Previous studies have also examined the use of internet marketing technologies to enhance interactions between firms and customers. Internet marketing encompasses digital marketing and social media marketing (Schibrowsky et al., 2007; Bartoloni and Ancillai, 2024), sales force automation systems (Lastner et al., 2024; Larpsiri and Speece, 2004), social media platforms (Appel et al., 2020), customer relationship management tools (Santini et al., 2020), e-commerce websites (Lim et al., 2022; Nia and Shokouhyar, 2020), email marketing practices (Quach et al., 2022; Wang, 2021; Zhang et al., 2017), call service centers (Chen et al., 2021; Bharadwaj and Roggeveen, 2008), cloud services (Zhang et al., 2025; Schneider and Sunyaev, 2016), and web analytics tools (Wernerfelt et al., 2025; Järvinen and Karjaluo, 2015).

In the business operations context, many firms employ integrated solutions by combining internal and external technologies, often involving tools and services provided by external vendors (Ye, 2025; Pandey et al., 2020). Only a limited number of studies have examined the integration of marketing technology tools from a sourcing strategy perspective. Early studies by Veugelers (1997), Brady et al. (2002), and Cassiman and Veugelers (2006) consistently emphasized that balancing internal and external technologies remains a challenge for practitioners. The literature generally distinguishes between internal (i.e., in-house or insourced) and external (i.e., outsourced) information technology sourcing (Lacity, 2002). Information technology insourcing refers to a firm's ability to develop and manage technology internally, whereas information technology outsourcing refers to the use of third-party vendors to provide information technology services (Veugelers, 1997; King and Malhotra, 2000; Rouse, 2009; Kranz, 2021). Within the information technology sourcing literature, the distinction between insourcing and outsourcing has been widely documented and validated by several studies (Han and Mithas, 2013; Bapna et al., 2023).

Recent research on information technology outsourcing can be summarized as follows. Govender (2016) investigated inbound call center outsourcing and its impact on customer service experiences within a major mobile telecommunications company in South Africa. Hanafizadeh and Zare Ravasan (2018) examined information technology outsourcing configurations and their role in supporting customer-related services. Research on customer relationship management outsourcing has suggested that outsourced marketing technology may integrate multiple marketing functions, including call center operations, website management, direct mail services, email marketing, database management, campaign management, and customer experience strategies. Furthermore, Kaur and Biswas (2024) reported that key factors influencing outsourcing decisions include business objectives and the ability to respond effectively to

market demands.

With respect to information technology insourcing, relatively few studies have been conducted. Watjatrakul and Drennan (2005) examined factors influencing e-mail marketing sourcing decisions and explained how firms choose between insourcing and outsourcing e-mail marketing technologies. In addition, Horsky et al. (2012) investigated the use of in-house advertising agencies and reported that approximately half of U.S. advertisers operated internal agencies. Rikhi (2022) suggested that insourced marketing technologies can be developed to satisfy the specific needs of individual organizations. More recently, Gujar et al. (2024) found that in-house marketing automation workflows can improve organizational agility and enhance customer interactions.

In summary, both insourcing and outsourcing strategies are closely related to a firm's marketing operations and technology utilization. Brady et al. (2002) examined the integration of information technology into marketing practice, while Mariam (2024) emphasized the importance of integrating information technology with marketing strategies. Such integration may involve both insourced and outsourced marketing technology tools and can assist organizations in addressing business challenges.

Therefore, the current study provides an organizational framework for understanding how marketing technologies are utilized within firms based on sourcing strategies and explores evidence regarding the extent to which marketing technologies can enhance marketing functions. The findings may serve as both academic and practical guidance for addressing marketing-related information technology issues.

3. Method and Data Collection

The objective of this research was to determine how marketing technology tools are utilized and to examine the extent of insourcing and outsourcing practices. Specifically, the study aimed to categorize and validate MarTech tools based on insourcing and outsourcing strategies. This research also sought to describe the current status of marketing technology tools used by organizations.

Secondary data were collected from firms listed on the Stock Exchange of Thailand (SET) by examining marketing technology tool icons displayed on corporate websites. Purposive sampling was employed to select firms that met the following inclusion criteria: (1) the firm was officially listed on the SET during the data collection period; (2) the firm maintained an accessible corporate website; and (3) the website disclosed identifiable MarTech tools. The final dataset consisted of 100 firms. The collected data included firm name, website, industry sector, and marketing technology tools. Table 1 presents the marketing technology tools identified in the sampled firms.

In addition, the identified MarTech tools were classified by both the researcher and an independent information technology professional. The researcher reviewed the marketing technology tool icons displayed on each firm's website. The independent judge evaluated the technological characteristics and required functionalities of each tool to ensure accurate classification of insourced and outsourced marketing technologies. The tools were subsequently categorized according to their contributions to the marketing mix (4Ps).

Data Analysis

The data analysis consisted of two stages.

Step 1: Coding and Classification

Each marketing technology tool was coded according to its functional type (e.g., analytics, marketing automation, customer relationship management, and search engine optimization) and sourcing mode (insourced or outsourced). The tools were also mapped to the digital transformation dimensions of the marketing mix (4Ps) (Süthoff, 2018).

Step 2: Descriptive Statistics

Descriptive statistics were used to summarize the frequency and proportion of MarTech adoption by tool type, sourcing mode, and industry sector.

4. The results

Four Ways for Utilizing MarTech Tools

The application of marketing technology tools still requires further clarification. Although previous studies have addressed this topic, there remains limited understanding of how marketing technologies can be effectively implemented within the context of information technology sourcing (Veugelers, 1997; King and Malhotra, 2000) and the 4Ps marketing mix (Van Waterschoot and Van den Bulte, 1992; Grönroos, 1994; Constantinides, 2006). By analyzing the available information, two dimensions can be identified: information technology sourcing and the 4Ps of the marketing mix. These dimensions provide a framework for understanding the use of marketing technology tools. Table 1 summarizes the number of marketing technologies in each category and subcategory.

According to Van Waterschoot and Van den Bulte (1992), Grönroos (1994), and Constantinides (2006), the marketing mix consists of four widely accepted dimensions: product, price, place, and promotion. This study categorizes marketing technology tools according to these four dimensions to facilitate the examination of marketing technology utilization from a marketing perspective. This approach may assist marketers in understanding marketing technology tools and developing appropriate technology strategies.

From an information technology sourcing perspective (Veugelers, 1997; King and Malhotra, 2000), tech-

Table 1. Classification of marketing technology tools used by listed firms

No.	Group	MarTech Tools	No.	Group	MarTech Tools
1	Social Media	Facebook, Twitter, Instagram, Momentum, Google Plus, Tumblr, Flickr, Scribd, Weibo, Pinterest	13	Broadcast and Online Radio	Radio
2	Social Messaging Voice and Video Calling	Line, WeChat, Skype, Viber, Google Hangout	14	Chat Service	Live Chat (Insourcing), Live Chat (Outsourcing)
3	Online Payment	WePay, Samsung Pay, Apple Pay, Google Wallet	15	Search Engine	Search Engine (Outsourcing), Search Engine (Insourcing)
4	Website	Tripadvisor, WordPress, Blogspot (Outsource), Blogspot (Insource), HolidayCheck, RSS Feed	16	Online App and Media Store	iTunes Preview, Google Play, Windows App Store
5	E-mail System	E-mail Subscription, Smarter-Mail	17	Online Statistics Service	Outsourcing Statistics (TrueHits)
6	Telephone	Telephone, Hotline, Free Line	18	Booking Agency	Booking Outsource, Map Web-App, Map App, Foursquare
7	Physical Store	Local Store, Convenience Store, Hypermarket Store	19	E-commerce and Logistic Distribution Service	Online Order Tracking (Insourcing), Online E-commerce (Insourcing), UrbanBox, AEC Connect
8	Location-Based and Map Web/App	Map Web-App, Map App, Foursquare	20	Visual Technology	QR Code, Augmented Reality
9	Online Advertising	Ad Choices, AdWords, AdSense, Cookie Policy	21	Virus Scan	Trend Micro, Kaspersky
10	Online Video	Vimeo, YouKu, YouTube, Line TV, Facebook Live	22	Cloud Service	Cloud Computing (Insourcing), Microsoft Azure
11	Online Magazine	E-magazine, Online Book Store			
12	Broadcast Media	Domestic TVC, Global TVC, Digital TV			

nology sourcing is generally classified into two categories: insourcing and outsourcing. This study reviews marketing technology tools within three sourcing-related subcategories.

The first subcategory covers marketing technology insourcing tools, where firms employ technologies developed and managed internally. The identified insourcing tools were grouped into visual technology, social media, social messaging applications, websites, physical stores, online media/radio, e-mail systems, telephones, and online video platforms. This category focuses on marketing activities supported primarily through internally managed technologies.

The second subcategory covers marketing technology outsourcing tools. The identified outsourcing tools were grouped into online applications and media stores, visual technology, cloud technology, online payment systems, booking agencies, social messaging applications, social media, location-based applications, cloud-service websites, e-mail systems, and online video platforms. Outsourcing refers to the practice of utilizing third-

party vendors to provide information technology services (Han and Mithas, 2013). Previous studies have suggested that outsourcing technologies may reduce costs through lower investments in internal infrastructure facilities (Kotabe et al., 2008; Han and Mithas, 2013). In this subcategory, firms are able to utilize various marketing technologies that are often freely available or accessible at relatively low cost.

The third subcategory represents firms that employ both insourcing and outsourcing strategies, referred to as a hybrid sourcing approach. This category represents the intersection of insourced and outsourced marketing technologies and reflects a higher level of technology integration. The identified tools were grouped into social media, social messaging applications, websites, physical stores, online media/radio, visual technology, e-mail systems, telephones, and online video platforms. This study examines the extent to which marketing technologies are integrated into firm operations and the extent to which firms combine internal and external technology sources. Technology integration has been associ-

ated with improved operational efficiency. For example, Larpsiri and Speece (2004) suggested that technology integration reflects the extent to which technologies are embedded in organizational operations and customer interactions.

To compare marketing technology categories based on insourcing and outsourcing strategies, descriptive statistics were employed. The analysis covered 58 marketing technology tools classified into 22 MarTech categories. The key findings are summarized according to the relationship between technology sourcing and the 4Ps marketing mix.

The data were analyzed according to marketing mix dimensions, sourcing strategies, and firm characteristics.

1. Product Facilitation

The marketing technologies associated with product development and support were classified into three subcategories: online applications and media stores, visual technology, and cloud technology. The highest percentage was observed in online applications and media stores, whereas the lowest percentage was observed in visual technology. The findings suggest that hybrid sourcing strategies are commonly associated with visual technologies. The results indicate that the integration of insourced and outsourced MarTech tools has been implemented by many firms. Among the sampled firms, iTunes Preview and Google Play were among the most frequently utilized tools. However, the specific technologies adopted varied according to industry sector.

2. Price Facilitation

Marketing technologies related to pricing and payment services were classified into three subcategories: online payment systems, credit card services, and booking agencies. The highest percentage was observed for online payment systems, whereas the lowest percentage was observed for booking agencies.

3. Place Facilitation

Marketing technologies associated with distribution and placement activities were classified into twelve subcategories: social media, social messaging applications, websites, physical stores, map web/app services, broadcast media/radio, online media/radio, online applications and media stores, booking agencies, e-commerce and logistics distribution services, cloud services, and visual technologies. The highest percentage was observed for social media, whereas the lowest percentage was observed for booking agencies.

4. Promotion Facilitation

Marketing technologies associated with promotional activities were classified into eleven subcategories: websites, e-mail systems, telephones, online video, online advertisements, online magazines, broadcast media/radio, online media/radio, search engines, online statistics services, and booking agencies. The highest percentage was observed for websites, whereas the lowest percentage was observed for online statistics services.

The proposed marketing technology framework raises the question of whether its underlying assumptions are consistent with actual organizational practices. The findings provide evidence supporting the validity of the framework by demonstrating how marketing technologies are utilized under real-world conditions. The study therefore contributes to understanding the current state of marketing technology adoption and utilization in organizations.

The identified marketing technology tools were classified into several categories and subcategories for subsequent analysis. Table 2 presents the categories of marketing technologies employed in this study.

5. Discussion

The findings reveal that Thai listed firms adopt MarTech tools unevenly across the marketing mix dimensions, with promotion and place exhibiting the highest adoption frequencies. This pattern reflects the evolution of digital marketing described by Constantinides (2006) and Grönroos (1994), which emphasizes customer interaction and channel integration. The presence of hybrid sourcing models also supports the argument of King and Malhotra (2000) and Reji (2025) that hybrid sourcing represents a strategic response to the trade-off between cost reduction and technological flexibility.

Consistent with the findings of Han and Mithas (2013), firms utilizing hybrid MarTech sourcing approaches may achieve greater operational efficiency and innovation capability. The results therefore support previous theoretical and empirical studies regarding the role of marketing technologies in business operations. Both qualitative observations and quantitative findings suggest that MarTech tools have become an important component of modern marketing operations and customer relationship management.

Future business environments are expected to incorporate artificial intelligence technologies more extensively. However, issues related to data privacy, security, and confidentiality remain important concerns. Future research should therefore investigate the adoption of artificial intelligence technologies under both insourcing and outsourcing arrangements and examine the factors that organizations should consider when making technology sourcing decisions.

6. Conclusion and Research Implications

The use of marketing technology (MarTech) continues to increase among firms, particularly in activities that enhance interactions between marketers and customers. Marketing solutions have become an important component of the marketing toolbox because many business operations and marketing activities increasingly depend on digital technologies. Despite the growing importance of MarTech, limited research has examined the classification and utilization of marketing technology tools from a sourcing perspective.

The purpose of this study was to investigate how marketing technologies are utilized in firms and to validate a marketing technology framework based on sourcing strategies. Using data collected from 100 firms listed on the Stock Exchange of Thailand, the study identified and classified marketing technology tools according to insourcing and outsourcing approaches. The findings indicate that MarTech adoption can be examined through two sourcing dimensions, namely insourced and outsourced technologies. Based on this classification, 22 categories of marketing technology tools were identified.

The findings provide a framework that may assist researchers and practitioners in understanding how marketing technologies are adopted and integrated within organizations. The framework also contributes to the literature by providing a practical perspective on the relationship between marketing technology utilization and sourcing strategies.

Based on the findings, the following recommendations are proposed:

1. Explore the use of marketing technologies across all industry sectors listed on the Stock Exchange of Thailand, including tourism, telecommunications, food, agriculture, and healthcare sectors.
2. Investigate the impact of marketing technology integration on organizational performance and business outcomes.
3. Examine the effectiveness of insourcing and outsourcing strategies in supporting marketing technology solutions.

Research Limitations and Future Research

The findings are limited to firms within the selected database and a single-country context. Therefore, the results cannot be generalized to broader international settings. Future research should incorporate organizations from multiple countries and collect additional evidence through interviews with marketing and technology professionals. Such investigations would help validate whether the marketing technologies displayed on corporate websites are actively utilized in daily operations and assess their contributions to marketing performance and business outcomes.

CRedit Authorship Contribution Statement

Chaknarin Kongcharoen: Conceptualization, Methodology, Validation, Investigation, Resources, Data curation, Funding acquisition, Writing - original draft, Supervision. **Thanyalak Mueangkhot:** Conceptualization, Methodology, Formal analysis, Validation, Investigation, Resources, Writing - review & editing.

Declaration of Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Table 2. Categories of marketing technology based on the marketing mix and sourcing approach

Category	Marketing Technology	Description	Insourcing	Outsourcing
Product	Online App and Media Store	An online store platform used to create software and media products.	✓	
	Visual Technology	Visual technology used to create multimedia products.	✓	✓
	Cloud Technology	Cloud technology used to create cloud-based services.	✓	
Price	Online Payment/- Money	An online payment system used to manage pricing and financial services, such as payment processing and personal loans.	✓	
	Credit Card	A credit card system used to support pricing and financial services.	✓	
	Booking Agency	A booking service used to manage reservations and pricing.		✓
Place	Social Media	An online social network used as a virtual channel for presenting products.	✓	✓
	Social Messaging App	A mobile social networking application used as a virtual channel for presenting products.	✓	✓
	Website	A website used as a virtual channel for presenting products.	✓	✓
	Physical Store	A physical retail location used for presenting and distributing products.	✓	✓
	Map Web/App	A web-based or mobile mapping platform used to provide product location information.	✓	
	Broadcast Media/Radio	Broadcast television and radio used as sales channels.		✓
	Online Media/Radio	Online television and radio used as sales channels.	✓	✓
	Online App and Media Store	An online platform used as a sales and purchasing channel.	✓	
	Booking Agency	A booking platform used as a sales channel.		✓
	E-commerce and Logistic Distribution Service	An electronic platform used for selling, purchasing, and distributing products.	✓	
Promotion	Cloud Service	Cloud technology used to support sales and purchasing channels.	✓	
	Visual Technology	Visual technology used to support sales and purchasing channels.	✓	✓
	Mobile App	A mobile application used for product distribution and service delivery.	✓	
	Social Media	An online social network used for advertising and promotion management.	✓	✓
	Social Messaging App	A mobile social networking application used for advertising and promotion management.	✓	✓
	Website	A website used for advertising and promotion management.	✓	✓
	E-mail System	An e-mail system used for advertising and promotion management.	✓	✓
	Telephone	A telecommunication system used for advertising and promotion management.	✓	
	Online Video	An online video platform used for advertising and promotion management.	✓	✓
	Online Advertising	An online advertising platform used for advertising and promotion management.		✓
	Online Magazine	An online magazine used for advertising and promotion management.	✓	✓
	Broadcast Media/Radio	Broadcast television and radio used for advertising and promotion management.		✓
	Online Media/Radio	Online television and radio used for advertising and promotion management.	✓	✓
	Search Engine	A search engine used for advertising and promotion management.		✓
	Online Statistics Service	An online analytics service used to collect and analyze promotional data.		✓
	Booking Agency	A booking platform used to support promotional activities.		✓
	Mobile App	A mobile application used for advertising and promotion management.	✓	✓