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MOTTO: New Horizons in Economics and Business

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Current Digital Technologies and Their Impact on Marketing: Qualitative Analysis of the Czech Business Environment

Abstract: This article presents a comprehensive analysis of the impact of selected emerging technologies on the transformation of contemporary marketing practices, with a special focus on the Czech business environment. The focus is on the integration of advanced artificial intelligence, distributed data structures (**big data**), Internet of Things (**IoT**), blockchain platforms, robotic systems, cloud computing, and immersive technologies (**AR/VR/metaverse**) into strategic and operational marketing processes. The study aims to conduct a multi-paradigm synthesis of the impact of these technologies on redefining core marketing principles, including value creation, personalization of customer experience, and optimization of decision-making mechanisms. Methodologically, the research is anchored in a systematic literature review (**SLR**) and a qualitative investigation through semi-structured interviews with selected marketing practitioners.

The findings empirically confirm the growing importance of data-driven approaches, predictive analytics, and automation in building customer relevance and campaign effectiveness. They also identify the major ethical, legal, and societal challenges associated with algorithmic decision-making, data management, and transparency of digital processes. Based on the research findings, the paper formulates recommendations for the strategic implementation of digital technologies in marketing with an emphasis on accountability, ethics, and long-term sustainability. The study contributes to broadening the academic debate on the technological transformation of marketing and offers theoretical and practical impetus for further research on digital customer relationship management in the Central European environment.

Key Words: Artificial Intelligence, Digital Marketing, Personalization, Marketing Technology, Ethical Challenges.

JEL Classification: M31, M37

Introduction

The field of marketing has undergone a major transformation in recent decades due to the rapid development of digital technologies (Guhl et al., 2024). Modern technologies, including artificial intelligence (AI), the Internet of Things (IoT), big data analytics, blockchain, and immersive virtual environments, have revolutionized the way companies engage with consumers, develop strategies, and measure the effectiveness of campaigns (Kotler et al., 2021; Plangger et al., 2022). These changes have created new opportunities in personalization, predictive analytics, and content targeting, but have also raised significant ethical and operational challenges (Knihova, 2024; Alijoyo et al., 2025). This study aims to explore how current digital technologies are changing marketing practice in the context of Czech business ecosystems. Based on the analysis of theoretical and empirical perspectives, it seeks to identify the key technologies with the greatest impact on marketing operations and assess their transformative impact on traditional marketing models. Particular attention is paid to AI-driven personalization, predictive marketing, and the role of new technologies in customer segmentation and targeting (Fam, 2024; Lessmann, 2021).

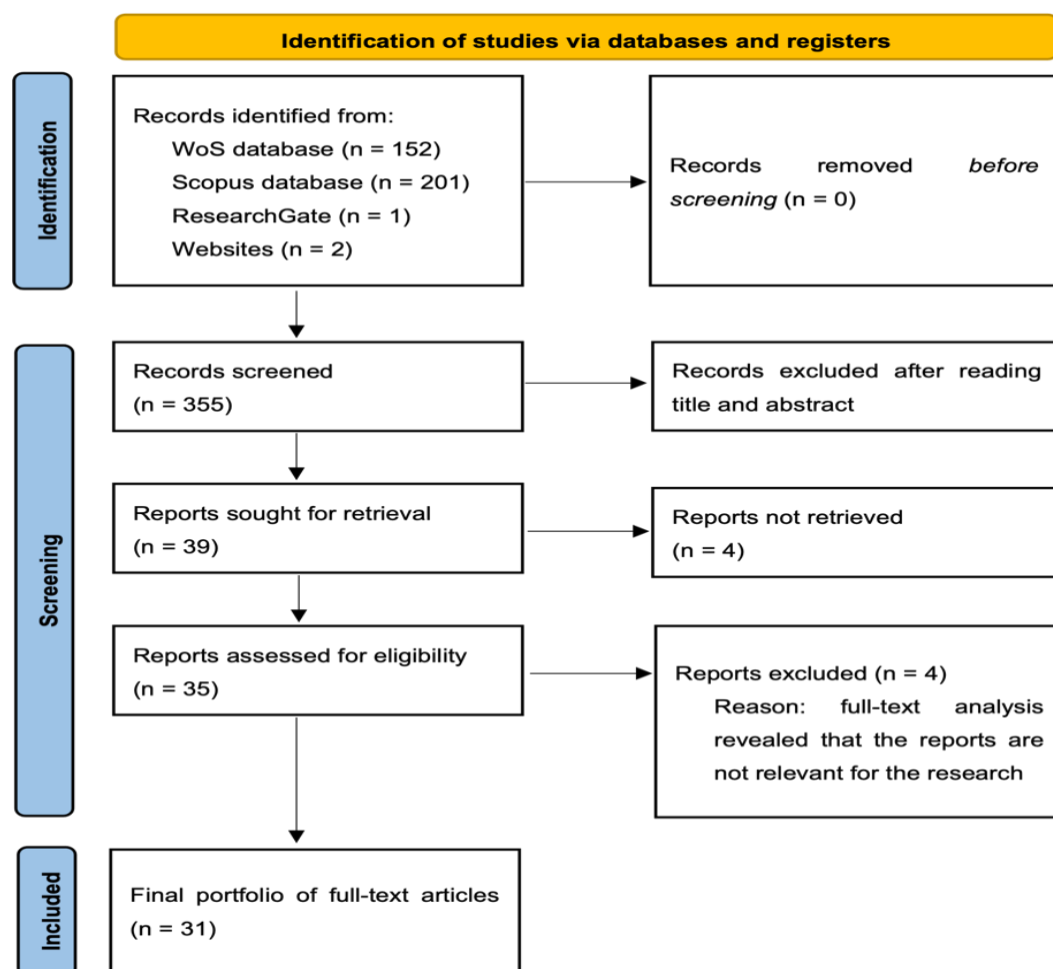
The importance of integrating ethical and socially responsible approaches into digital marketing strategies has increased in response to algorithmic decision-making and large-scale data collection (Sultana et al., 2016; Naz, 2020). Current discourse emphasises the need to balance technological innovation with transparent and responsible data practices, particularly within regulatory frameworks such as the EU's Artificial Intelligence Act (Iyer, 2025). Methodologically, this study combines a systematic literature review (SLR) with qualitative research conducted through semi-structured interviews with marketing professionals in the Czech Republic. This blended approach allows for a deeper understanding of the theoretical underpinnings and practical implementation of modern technologies in marketing management (Yeh et al., 2025; Fam et al., 2024). By synthesizing findings from the literature and practical insights, the paper offers a comprehensive view of the role of digital technologies in marketing and provides practical recommendations for adapting marketing strategies to technological change. It positions contemporary technologies not only as tools of efficiency and engagement but also as socially embedded phenomena that shape brand-customer relationships in fundamentally new ways (Kotler et al., 2021; Naz, 2025).

1. Methods of Research

This study applies a multi-method research framework that combines a systematic literature review (SLR) with qualitative empirical investigation through semi-structured interviews. This combination allows for a deeper understanding of the current use of modern technology in marketing practice and the theoretical concepts that frame this transformation. The theoretical foundation is based on a systematic literature review that serves as a standardized and reproducible tool for synthesizing the findings. The SLR aimed to identify key digital technologies applied in marketing, analyse their applications, and reflect on the related ethical and social implications. The approach was based on the

methodological framework of Eger & Hommerova (2024), including the identification of research questions, selection criteria, and data collection procedures. Database research was conducted in the Web of Science and ScienceDirect platforms using a combination of keywords such as "marketing", "modern techn*", "contemporary techn*", "metaverse", or "disruptive techn*". Due to the dynamics of the field, only studies published between 2023 and 2025 were included in the analysis. From the approximately 350 records found, the 28 most relevant publications were selected based on titles, abstracts, and keywords, taking into account the planned scope of the search. Articles found outside citation databases (e.g., ScienceDirect) were subsequently searched in the WoS and Scopus databases for bibliometric analysis of citation networks. Two web publications and one ResearchGate record were also included to complement specific subject areas, but were not part of the bibliometric analysis.

Fig. 1: The process of selecting articles for the systematic literature review by the PRISMA methodology



Source: own processing based on (Eger & Hommerova, 2024)

The selection procedure is depicted in the PRISMA scheme (Fig. 1). Bibliometric analysis was performed using VOSviewer software to visualize co-citation networks, author

clusters, and co-occurrence of keywords (Eger & Hommerova, 2024). Thematic synthesis subsequently identified seven dominant technology domains: artificial intelligence, Internet of Things, big data, blockchain, robotics, augmented/virtual reality, and cloud computing (Kotler et al., 2021; Plangger et al., 2022). Particular attention has been paid to the ethical aspects of digital transformation, especially privacy issues, algorithmic bias, and transparency (Alijoyo et al., 2025; Sultana et al., 2016). This theoretical framework also served as a starting point for the design of the qualitative part of the research. The empirical phase of the study is based on qualitative research focused on the implementation of selected digital technologies in Czech marketing practice. The data was obtained through semi-structured interviews with ten experts from the field of marketing, strategic management, and data analytics. The respondents were selected purposively with an emphasis on their practical experience with the application of marketing technologies in medium and large enterprises. The interview protocol was designed based on the findings of a systematic literature review and focused on five key areas: (1) technology awareness and adoption, (2) benefits and limitations, (3) impact on traditional marketing models, (4) personalization and targeting, and (5) ethical and regulatory challenges. Interviews were conducted in person or online, lasting between 30 and 60 minutes. Recordings were transcribed and analysed through thematic coding in NVivo software. The coding framework was developed iteratively to enable inductive identification of sub-themes while maintaining consistency with the categories defined in the SLR phase. This procedure ensured high methodological consistency and traceability of the analysis.

The qualitative research focused on the following research questions:

- **VO1:** What current technologies have the greatest impact on the effectiveness of marketing strategies?
- **VO2:** How does the use of current technologies affect the targeting and personalization of marketing campaigns?
- **VO3:** How do new technologies affect traditional forms of advertising?
- **VO4:** What are the challenges and ethical issues raised by the use of modern technologies in marketing?

This dual approach, combining systematic review and qualitative investigation, allows for a comprehensive exploration of conceptual trends and practical implementation of digital technologies in marketing. This methodology also supports the triangulation of data sources, thereby enhancing the credibility and depth of the research (Kotler et al., 2021; Rosario et al., 2023).

2. Results of the Research

A bibliometric analysis was conducted to identify the main thematic areas dominating the discourse on modern technologies in marketing. This approach included an analysis of keyword frequency, source citations, and identification of key authors and journals that have made the most significant contribution to research in the area. Tables of publications were tabulated as part of the analysis, including the country of origin and a summary of the journals where the articles were published.

Tab. 1: Geographical affiliation of authors

Authors	Country
Al-Ali, A., Gupta, R., Zualkernan, I., & Das, S. K. (2024)	UAE (United Arab Emirates), USA
Bakator, M., Čočkaló, D., Makitan, V., Stanisavljev, S., & Nikolić, M. (2024)	Serbia
Bamberger, B., Reinartz, W., & Ulaga, W. (2025)	Germany, UAE
Behera, R. K., Rehman, A., Islam, M. S., Abbasi, F. A., & Imtiaz, A. (2024)	India, Saudi Arabia
Behl, A., Nigam, A., & Vrontis, D. (2024)	India, Cyprus
Besim, R., & Sharma, B. P. (2023)	Nepal
Cheng, C. C., & Shiu, E. C. (2023)	Taiwan, United Kingdom
Duggal, N. (2024)	India
Fam, K., Liu, Y., Wei, S., Edu, T., Zaharia, R., & Negricea, C. (2024)	China, Romania
Guhl, D., Paetz, F., Wagner, U., & Wedel, M. (2024)	Germany, Austria, USA
Hanneke, B., Skiera, B., Kraft, T. G., & Hinz, O. (2024)	Germany, Australia
Horng, J., Liu, C., Chou, S., Yu, T., Chang, Y. E., & Hu, D. (2024)	Taiwan
Iyer, P., & Bright, L. F. (2024)	USA
Joshi, D. (2024)	India
Kim, I., Ki, C., Lee, H., & Kim, Y. (2024)	USA, Hong Kong
Kumar, H. (2024)	India
Kumar V., Ashraf A.R., & Nadeem W. (2024)	India, Canada
Mahr D., Odekerken-Schröder G., & Van Doorn J. (2025)	Netherlands
Mukhopadhyay S., Singh R.K., & Jain T. (2024)	India
Naz, H. & Kashif, M. (2025)	Pakistan
Nikseresht A., Shokouhyar S., Tirkolae E.B., & Pishva N. (2024)	USA, Australia, Turkey, Taiwan, Azerbaijan, Iran
Oklander M., Panchenko M., Pavlishyna N., Larina K., & Boiko R. (2024)	Ukraine
Pedersen C.L. & Ritter T. (2024)	Denmark
Pereira I., Madureira A., Bettencourt N., Coelho D., Rebelo M.Â et al. (2024)	Portugal
Peštek A. & Ejubović H. (2024)	Bosnia and Herzegovina
Rehman, A., Behera, R. K., Islam, M. S., Elahi, Y. A., Abbasi, F. A., & Imtiaz, A. (2024)	Saudi Arabia, India
Ren, G., Chen, Y., & Yang, M. (2024)	China
Rivas, P., & Zhao, L. (2023)	USA
Sun, Y., Bai, Y., & Zhou, Z. (2024)	China, USA
Tukur, M., Schneider, J., Househ, M., Dokoro, A. H., Ismail, U. I., Dawaki, M., & Agus, M. (2024)	Qatar, Nigeria
Yao, K. (2024)	China

Source: own processing

In addition, the software application VOSviewer was used to visualize networks of the most frequently cited authors, references, and their interrelationships. Based on these outputs, partial conclusions were formulated.

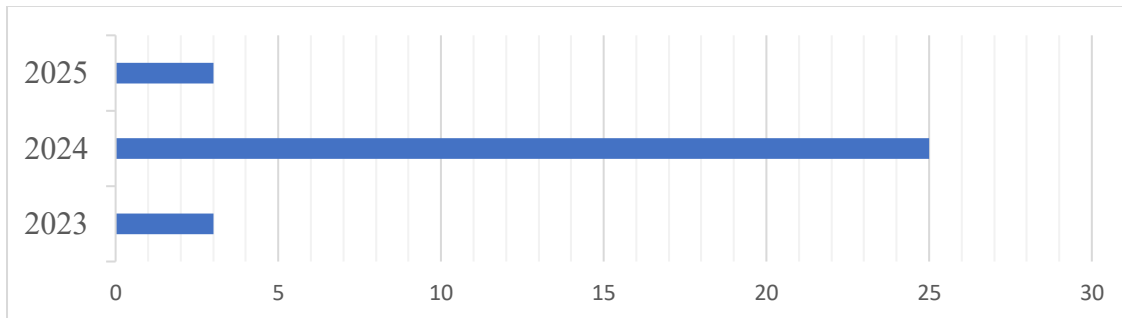
Tab. 2: Publications by the journals in which they were published

Journal / Source	Number of publications	Publications
AAFT Blog	1	Joshi, D. (2024)
AI	1	Rivas, P. & Zhao, L. (2023)
Acta Psychologica	1	Kumar, H. (2024)
Botfed Research Society	1	Besim, R. & Sharma, B. P. (2023)
Heliyon	1	Bakator, M. et al. (2024)
Industrial Marketing Management	1	Pedersen, C. L. & Ritter, T. (2024)
Informatics	1	Pereira, I. et al. (2024)
Information & Management	1	Cheng, C. C. & Shiu, E. C. (2023)
International Journal of Information Management	1	Kumar, V. et al. (2024)
International Journal of Information Management Data Insights	1	Mukhopadhyay, S. et al. (2024)
International Journal of Research in Marketing	1	Hanneke, B. et al. (2024)
Journal of Business Research	4	Bamberger, B. et al. (2025); Iyer, P. & Bright, L. F. (2024); Kim, I. et al. (2024); Mahr, D. et al. (2025)
Journal of Business-to-Business Marketing	1	Fam, K. et al. (2024)
Journal of Cleaner Production	1	Behera, R. K. et al. (2024)
Journal of Contemporary Management Issues	1	Peštek, A. & Ejubović, H. (2024)
Journal of Consumer Behaviour	1	Behl, A. et al. (2024)
Journal of Hospitality Leisure Sport & Tourism Education	1	Horng, J. et al. (2024)
Journal of King Saud University - Computer and Information Sciences	1	Tukur, M. et al. (2024)
OR Spectrum	1	Guhl, D. et al. (2024)
Pacific Business Review (International)	1	Oklander, M. et al. (2024)
Pervasive and Mobile Computing	1	Al-Ali, A. et al. (2024)
Spanish Journal of Marketing - ESIC	1	Naz, H. & Kashif, M. (2025)
Simplilearn.com	1	Duggal, N. (2024)
Technology in Society	2	Rehman, A. et al. (2024); Ren, G. et al. (2024)
Internet of Things	2	Nikseresht, A. et al. (2024); Sun, Y. et al. (2024)
Measurement Sensors	1	Yao, K. (2024)

Source: own processing

The analysis also included an evaluation of the most frequently occurring keywords that help to define the thematic direction of the research field under study. Considering the time aspect, only publications from the last three years were included in the review. Most papers date from 2024, which confirms the high timeliness of the data and minimizes the risk of bias by outdated information (Fig. 2).

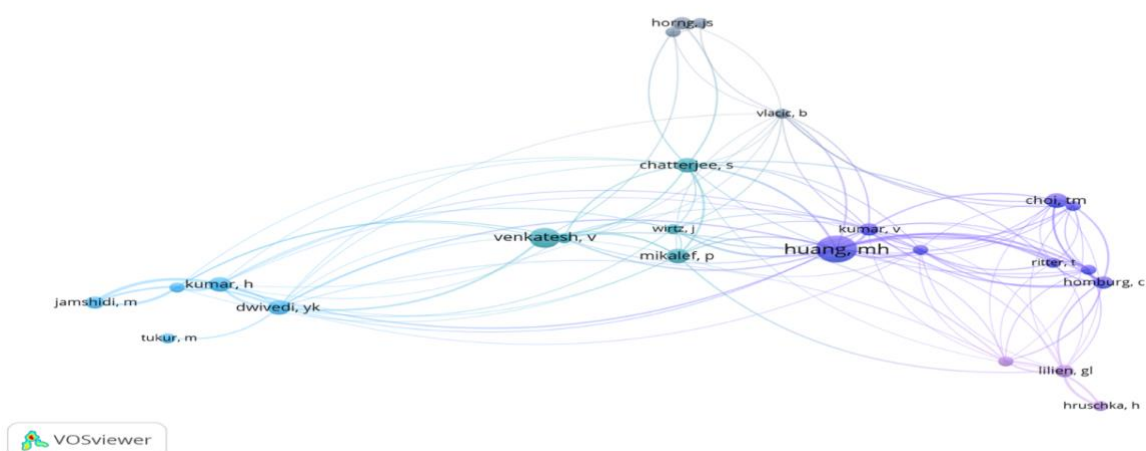
Fig. 2: Analysis of the years in which the articles selected for the SLR were published



Source: own processing

Tables 1 and 2 show that the combination of technology and marketing represents a very broad and multidisciplinary field in terms of topics. Publication activity in this field shows considerable geographical diversity, with articles coming from a wide range of countries. Similarly, the diversity of the journals in which these studies are published is significant. Unsurprisingly, India, whose research base has long been associated with information technology, data analytics, and digital innovation, strongly dominates the set of publications analysed. Among the most important publishing platforms in this context are the prestigious journals *Journal of Business Research*, *Technology in Society*, and *Internet of Things*, which provide a space for multidisciplinary research at the intersection of technology and marketing. Based on the bibliometric analysis, a network visualization of the most frequently cited authors within the sample of articles was then created. Only authors who were cited in four or more publications were included in the analysis.

Fig. 3: Citation network of co-cited authors



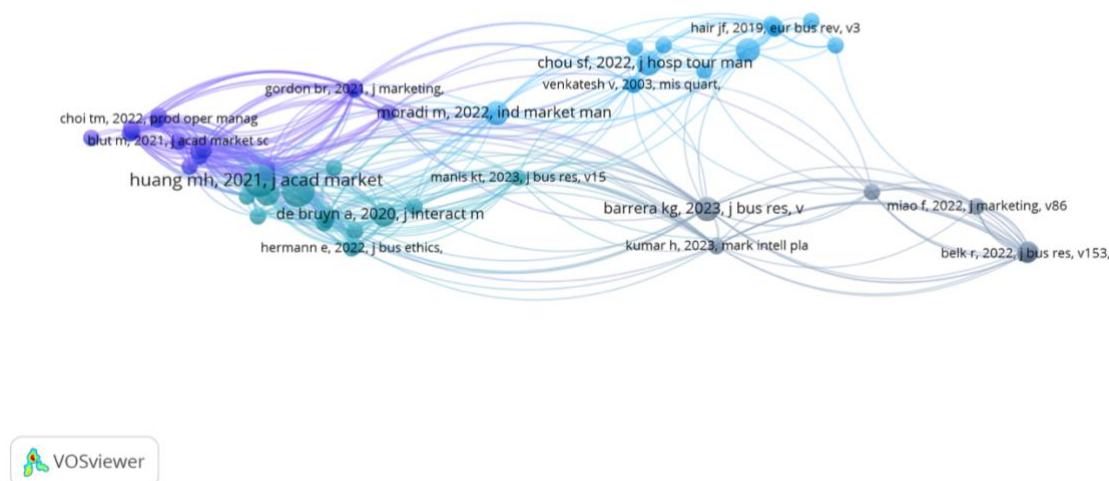
Source: own processing using VOSviewer software

The visualisation (Fig. 3) reveals four thematic clusters representing key research directions in the field of digital marketing.

- **The purple cluster** brings together authors (e.g., Choi, T.M.; Gordon, B.R.; Moradi, M.; Blut, M.) focusing on strategic marketing, brand management, and service innovation.
- **The blue cluster** (Venkatesh, V.; Hair, J.F.; Chou, S.F.) focuses on technology adoption, user behavior modeling, and quantitative methodology.
- **The turquoise cluster** (Huang, M.H.; De Bruyn, A.; Wirtz, J.) emphasizes the topics of customer experience, interactivity, personalization, and marketing ethics, with Huang as the central linking author.
- **The grey cluster** (Belk, R.; Kumar, H.; Miao, F.) brings cultural, value, and behavioural perspectives and addresses the social aspects of consumption and algorithmic marketing.

The second visualization (Fig. 4) shows the network of *co-cited* publications and includes sources cited in at least three cases. The output shows the basic literary framework of the field under investigation and confirms its interdisciplinary nature.

Fig. 4: Citation network of co-cited sources



Source: own processing using VOSviewer software

The visualization of the co-cited sources (Fig. 4) reveals four key thematic clusters.

- **The purple cluster** includes papers (Gordon, 2021; Choi, 2022; Moradi, 2022; Blut) focused on strategic marketing, digital innovation, and service optimization.
- **The blue cluster** represents the methodological pillars of consumer behavior research, including the TAM model (Venkatesh, 2003), PLS-SEM (Hair, 2019), and the contributions of Chou, S.F.
- **The turquoise cluster** includes resources focused on customer experience, value, and ethics (e.g., Huang, 2021; De Bruyn, 2020; Wirtz).
- **The grey cluster** (e.g., Belk, 2022; Miao, 2022) reflects the cultural, ethical, and behavioral dimensions of marketing in the context of digitalization.

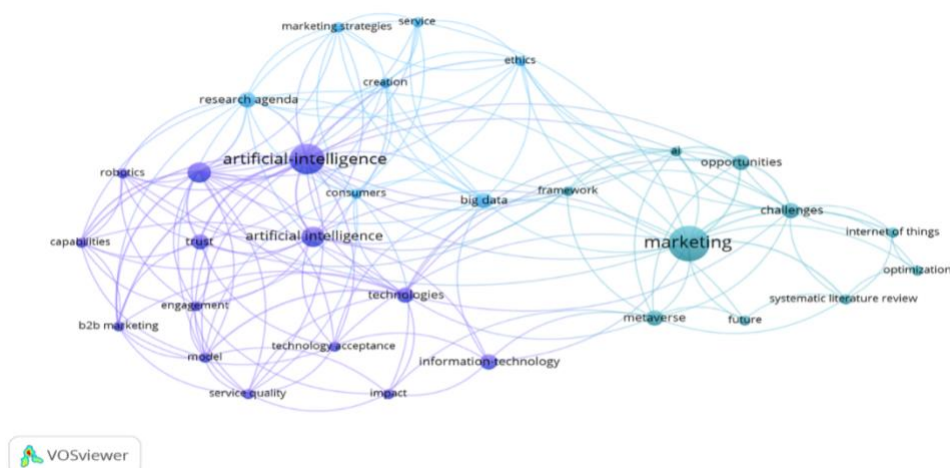
The third visualization (Figure 5) shows the networking of keywords. Based on the thematic context and the frequency of their co-occurrence, two dominant and one complementary cluster were identified to reflect the current research direction at the interface of marketing and modern technology.

The purple cluster reflects the link to artificial intelligence, with the dominant node *artificial intelligence* and related terms such as *robotics*, *technology*, *capabilities*, and *business models*, which highlights the growing importance of AI in professional discourse.

The turquoise cluster, centered around the key concept of *marketing*, includes terms such as *marketing strategies*, *Internet of Things (IoT)*, *information technology*, and *systematic reviews* that emphasize the practical application of marketing in the digital environment.

The blue cluster represents a hybrid field at the intersection of services, ethics, big data, and research approaches, highlighting the importance of methodological integrity and ethical standards in research.

Fig. 5: A network of the most frequently cited buzzwords

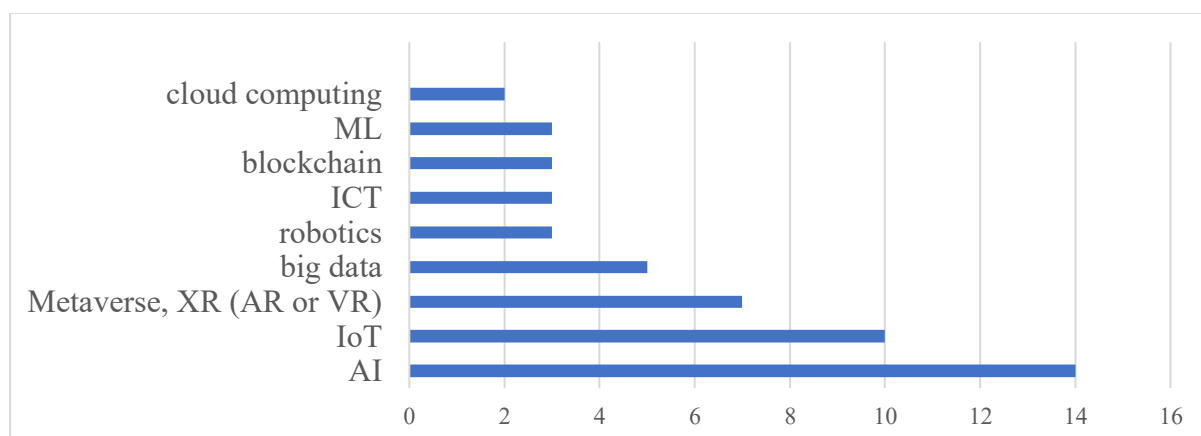


Source: own processing using VOSviewer software

Thematic analysis within the SLR was used to further interpret the content of the selected publications by identifying recurring patterns and key themes about the research questions posed. Publications were systematically analysed and relevant information (**keywords, technologies, themes**) was recorded in a summary table. On the basis of this analysis, the main areas of interest were identified, which allowed the SLR to be structured and the overview to be focused on thematic and technological priorities.

This method not only contributed to the identification of key trends but also ensured content linkage to the research questions. However, it should be noted that due to the limited sample of publications, the resulting representation of technologies may not fully reflect the current state of their use in marketing practice.

Fig. 6: Technologies ranked by the number of articles in which they are the subject (or one of the subjects) of research



Source: own processing using VOSviewer software

As the chart in Figure 6 suggests, the authors focus most on artificial intelligence, followed by the Internet of Things and metaverse (whether VR, AR, or XR). Big data has a fairly prominent presence, and robotics, blockchain, and cloud computing are mentioned the least, but still repeatedly. Based on the findings from the literature search, the practical part of the study focuses on a deeper understanding of the use of modern technologies in marketing through qualitative research among Czech marketing professionals. The aim is to reveal what technologies they use in practice, how they perceive their benefits and limitations, and how they reflect on the ethical, cultural, and contextual aspects of technological transformation in their local environment. Through semi-structured interviews with ten experts in marketing, data analytics, and business strategy, several thematic categories emerged that reflect the complexity of technology adoption, the changing role of traditional marketing, and the ethical dimension of digital transformation.

The empirical phase employed qualitative methods through semi-structured interviews with ten purposively selected experts in marketing, strategic management, and data analytics. Selection criteria prioritised demonstrable expertise in deploying advanced marketing technologies within medium and large enterprises. The cohort encompassed a heterogeneous spectrum of organisational scales and market segments, ranging from SMEs to large corporations, and included agency founders, executive managers, senior consultants, media strategists, and independent specialists. Sectoral representation covered creative design, digital strategy, media planning, performance marketing, and AI-enabled advertising. The extended respondent profile includes the name, surname, company affiliation, and job description, providing essential context for data interpretation and a deeper understanding of the participants' professional perspectives (Nováková, 2025).

The use of technology in Czech marketing practice. In their responses to the first question (see Tab. 3), respondents almost uniformly mentioned the daily use of digital platforms and tools for automation and analysis. Nine of them (R1- R9) work daily with cloud solutions, big data, and language models (custom GPT, Perplexity, Gemini, or internal LLM). Technologies such as big data

(R2-R9), cloud computing (R1-R4, R6-R9), and process automation through no-code platforms (e.g., Make.com - R9), scripts or ad hoc tools (R3) appear repeatedly in respondents' answers. R6 also mentions the use of robotics and Daktel's CCaaS solutions in the context of workflow standardization. Complementary technologies include IoT and eye-tracking (R4, R7-R8), used for multimodal analysis of customer behavior, and the internally developed SeLLMa model (R6) for advanced data analytics. Across the responses, a consensus is emerging on the day-to-day operational role of cloud services, artificial intelligence, and data tools, with individually variable add-ons depending on specialisation.

Tab. 3: Technologies used in the respondent's profession

Category/Technology	Number or	Respondents	Note / Examples
Language models / artificial intelligence	9	R1-R9	E.g., custom GPT, Perplexity, Gemini, Chat GPT, AI models
Big Data / Big Data	8	R2-R9	8 out of 9 respondents mention working with big data
Cloud/Cloud computing	6	R1, R2, R4, R5, R6, R7, R8	Explicitly mentioned as cloud, cloud computing or CCaaS
Data platforms and warehouses, Data processing software	5	R4, R5, R7, R8, R9	R4 - Easy Life data platform, R9 - Make.com no-code platform, statistical software
IoT, sensors, and audio matching	3	R4, R7, R8	Audio matching is performed via sensors and The information is transmitted via IoT
Eye tracking/eye cameras	3	R4, R7, R8	Mentioned in connection with heatmaps
Machine Learning (ML)	2	R2, R4	R2 and R4 more specifically referred to ML
Automation / Robotics	2	R3, R6	Process standardisation
API, scripts	2	R3, R9	Ad hoc scripts, API integration, and scripts to learn AI models

Source: own processing

In response to the second research question (see Tab. 4), respondents consistently identify artificial intelligence, particularly language models, as a core component of contemporary marketing (R1-R3, R7-R9), used to automate, generate content, and personalize messages. Big data analytics also remains a key tool for targeting campaigns and predicting customer behaviour (R2-R5).

Respondents emphasize the use of advanced platforms for predictive analytics and data integration, such as EasyLife (R4), as well as the deployment of internal language models and robotics for process standardization (R6). The consensus is that the synergistic integration of AI, data sources, and cloud services is a key enabler for effective

management of marketing campaigns. They identify personalization of the digital environment through dynamic web elements and algorithmic content customization as the most prominent trend (see Tab. 5) (R1). Custom GPT solutions enabling instant appointment transcription and technical language transformation (R2), or advanced AI agents with memory and basic autonomy (R3), are also finding application.

Tab. 4: The most essential technologies for marketing

Category / Technology	Number resp.	Respondents	Note / Examples
AI and language models	7	R1, R2, R3, R6, R7, R8, R9	E.g., use for graphics, creative process; text generation, strategy, translation, dictation, and transcription of conversations
Analytical tools/links data sources and work big data	3	R3-R5	Big data analytics, specifically, e.g. Easy-life interface (also suitable for predictions)
Machine learning	2	R2, R9	Listed as a recommendation tool offers, personalization
Sensors, an eye-tracking	2	R3, R4	
Automation	2	R3, R9	

Source: own processing

Tab. 5: Current technology trends considered to be the most significant

Category / Trend	Number or	Respondents	Note / Examples
Expanding the use of agents, assistants and robots	5	R2, R3, R6, R8, R9	Assistants for communication, robots for solving query-solving robots, machines combining databases for addressing customers
Content customization, personalization and personalization	3	R1, R4, R7	Automatic addition of descriptions under products, Epsilon platform for creating marketing personas, look-alike cookies
Technical language translation (custom GPT, support)	2	R2, R3	Custom GPT for customer queries, conversion technical language
Data merging, integration data platforms and forecast modules	2	R4, R7	EasyLife, merging data from different sources for easier use
Creative use of AI (generation of visuals)	1	R5	Generating visuals and support in inventing campaign

Source: own processing

Large-scale projects are dominated by the use of data-driven platforms (e.g., EasyLife, Epsilon) to benchmark and create marketing personas (R4), while the creative area works with AI-generated visuals and tools supporting campaign conception (R5). Other identified trends include the use of robotic assistants in customer care, prompt engineering, automated content summarization (R6), data merging and look-alike cookies (R7), and database linking for targeted outreach on LinkedIn (R8). Respondent R9 states that the concept of metaverse does not currently show practical relevance in the Czech marketing context. Respondents agree that automation and AI tools significantly increase efficiency and allow redirecting capacities to strategic activities. For example, a task that used to require 60 hours of programming is now completed in 30 minutes thanks to LLM (R3), while AI can generate advertising copy in minutes (R8).

Tab. 6: Barriers and challenges associated with technology implementation

Barrier categories	Number or	Respondents	Note / Examples
AI hallucinations/error rate	4	R3, R6, R7, R8	Problem with unreliability of AI outputs
Need for human validation and control	3	R1, R2, R4	Need for supervision and manual intervention when using AI
Problems with data quality	3	R2, R5, R9	Data preparation, lack of quality data, need for data pipelines
Financial constraints/investment costs	2	R3, R5	Higher investment for the implementation of specialized solutions
Data protection and contractual security	1	R4	Need for signed contracts, NDAs, and staff training

Source: own processing

Respondents also mention the impact of AI on creative outputs (R1, R5), automated communication summarisation (R6), and closing the gap between marketing professionals' experience (R9). The main barriers to technology implementation (see Tab. 6) are identified by some respondents as the lack of good quality and consistent data (R9), the so-called hallucination of AI, and the need for human validation of outputs (R2, R3, R6). Another barrier is the lack of trust and low willingness to adopt new tools (R1, R3), which some respondents address through training and internal education programs (R1, R4).

Respondent R2 stresses the critical importance of data preparation and building data pipelines as a prerequisite for effective use of AI, while R6 adds that it is essential to know the technological limitations and adapt internal processes to their operational compatibility. On the issue of personalisation and targeting (see Tab. 7), respondents agree that these activities are dependent on the synergy of big data and machine learning. R1 gives the example of grammatical modification of name addressing in emails to increase relevance, while R2 uses the Prophet model to predict purchase behavior and

optimize the site according to user segmentation. R3 and R9 apply RFM analysis and historical data for customer value and behavioral profiling.

Tab. 7: Use of technology for personalization, targeting, and prediction

Usage category	Number resp.	Respondents	Note / Examples
Personalisation and targeting with AI and ML	5	R1, R2, R3, R4, R8	E.g., personalization of emails, offers, and auction advertising space for immediate targeting
Predicting purchases, campaign success rates using large data and ML	4	R2, R3, R4, R6	Using Prophet, optimizing websites for internal analysis, finding trends and correlations based on data
Creating personas and targeting based on data	3	R3, R7, R9	Using customer data to create personas and target campaigns, RFM analyses, and the MML-TGI data set
Relying on advertising systems (S-click, Meta...) and their algorithms	2	R5, R8	Use of existing advertising systems with frequency and estimates, relying on the correct settings of their algorithms

Source: own processing

Respondents describe advanced personalization approaches based on a combination of data sources and automation. R4 combines anonymized sales data with video monitoring for real-time targeting at the point of sale; R7 uses MML TGI to create personas; R8 relies on algorithms from Meta and Google platforms to dynamically personalize campaigns. R6 introduces internal analysis of emails and calls to detect trends or employee performance potential. The most common risk is identified as GDPR breaches and misuse of personal data. R2 and R5 highlight the need for legal compliance, including proper cookie settings and client education; R3 highlights the legal risks associated with uploading personal data to LLM in light of the EU AI Act. R4 notes that regulatory requirements are slowing down opportunities for deeper personalisation, while R6 warns of the unclear labelling of AI chatbots and the risk of inadvertently sharing sensitive data; R7 highlights the risk of uncritical reliance on AI predictions, while R9 calls for respecting ethical limits, such as the prohibition of targeting by health status. All respondents agree that the processing of personal data must be transparent, lawful, and ethically sustainable to avoid legal and reputational impacts. The findings confirmed that Czech marketers are increasingly integrating technologies such as artificial intelligence, big data analytics, and automation tools into their daily activities. AI-driven personalisation was identified as the most commonly used feature, particularly in the areas of customer segmentation, product recommendation tools, and automated customer communication. Respondents emphasized the role of machine learning in improving the accuracy of targeting and content delivery (Cheng et al., 2023; Yeh et al., 2025).

While larger companies exhibited a higher degree of technological maturity, several mid-sized companies reported that they had limited resources when implementing more advanced tools, especially those that require significant data infrastructure or integration with legacy systems. Cloud computing, which offers scalable and cost-effective access to

computing resources, has often been cited as a means to overcome these limitations (Vemula et al., 2025; Zhang et al., 2023). Internet of Things (IoT) applications have so far been rare in the Czech context, but have been noted as an emerging area in retail and logistics, especially in inventory tracking and customer behaviour monitoring (Javaid et al., 2021). Augmented and virtual reality (AR/VR) solutions were seen as promising but underutilized due to high implementation costs and limited customer readiness.

Interviewees consistently reported that the use of data-driven tools and artificial intelligence had significantly changed their approach to marketing strategy. Campaigns are no longer based solely on intuition or experience, but increasingly rely on predictive analytics and behavioral modeling (Lessmann et al., 2021). Several respondents cited the ability to create dynamic, hyper-personalised content as a competitive advantage that increases customer satisfaction and conversion rates. Personalization strategies are primarily implemented through customer data platforms (CDPs), CRM systems, and dynamic email automation. Marketers stressed the importance of handling data ethically, noting that customers are increasingly sensitive to how their information is used. They shared concerns that excessive personalization can lead to perceptions of tracking or manipulation unless transparency and consent are ensured (Alijoyo et al., 2025; Lo & Campos, 2018).

Findings also show that traditional marketing practices have not been completely displaced. Rather, they coexist with digital methods in a hybrid model. Offline campaigns, emotional storytelling, and personal relationships remain key, especially in B2B marketing and in industries where digital adoption is still lagging. Respondents noted that digital tools enhance rather than replace traditional approaches by enabling more precise targeting and performance tracking (Kotler et al., 2021; Fam et al., 2024). Some participants expressed concerns about over-reliance on automation and algorithms, arguing that the human element in marketing - empathy, creativity, and contextual judgement - is irreplaceable and increasingly valuable in an AI-dominated environment (Scholda et al., 2023; Ngo et al., 2025).

A major theme identified in the research is the growing awareness of ethical issues associated with the use of technology. Respondents were aware of emerging legal frameworks such as the General Data Protection Regulation (GDPR) and the EU Artificial Intelligence Act, and several companies were actively adapting their practices to comply with these regulations (Book, 2024; Sultana et al., 2016).

The main ethical issues include:

- Ensuring data transparency and customer consent.
- Avoiding algorithmic bias in targeting and recommendations.
- Establishing clear accountability in automated decision-making.

Several marketers highlighted the need for internal guidelines and ethics training to complement legal compliance. While some firms have developed formal codes of ethics for digital marketing, others have relied on informal standards and managerial discretion.

3. Discussion

The findings of this study confirm that the integration of digital technologies into marketing practice is not a transient trend, but a major structural transformation with implications for the strategic and operational levels of marketing management. The results reflect the current scientific consensus that artificial intelligence, big data, and automation technologies represent the core of innovation processes about customers, optimization of communication strategies, and decision rationality (Kotler et al., 2021; Plangger et al., 2022). Empirical data reveal a significant correlation between technology adoption rates and firm competitive performance. Firms that have been shown to integrate predictive analytics and AI-based personalization mechanisms report increased efficiency at all stages of the customer cycle, from acquisition to retention (Guhl et al., 2024; Lessmann et al., 2021; Scholdra et al., 2023). These findings support the thesis that digital marketing enables firms to move from generic outreach to individualized interactions, thereby significantly increasing ROI.

At the same time, the adoption of these technologies appears to be uneven, with medium-sized firms in particular facing significant barriers in terms of resourcing, technological infrastructure, and professional capacity (Surur et al., 2025). These differences reflect a known asymmetry in the pace of digital transformation outside of multinational settings. The interviews also revealed a tension between technological automation and human creativity. Interviewees repeatedly expressed the belief that despite the high analytical capacity of AI, human judgment remains crucial, especially in the context of interpreting ambiguous situations, emotional signals, or culturally conditioned behaviors. These findings are consistent with the concept of augmented marketing, where AI is seen as a support tool, not a replacement for human decision-making structures (Kotler et al., 2021; Horng et al., 2022). Especially in areas such as dynamic ad targeting or price optimization, over-reliance on algorithmic decisions without human supervision can lead to ethical failures (Alijoyo et al., 2025). Thus, the study highlights the need to maintain a balance between performance rationality and ethical judgment.

The theme of the ethics of working with data resonated across all responses. Respondents emphasised the need for transparent, fair, and lawful handling of personal data, which corresponds with increasing regulatory requirements and public expectations (Sultana et al., 2016; Hanneke, 2024). Although existing legislation (e.g., GDPR and the upcoming AI Act) provides a framework, compliance with legal standards alone is insufficient - companies should actively build internal ethics policies, audit mechanisms, and accountability architecture (Horng et al., 2024). Ethical digital marketing thus becomes not only a compliance issue, but a strategic imperative and a key element of reputation management (Fam et al., 2024). Furthermore, research shows that digital and traditional marketing are not in a relationship of substitution but of complementarity. Hybrid models, integrating human creativity and digital capabilities, are expressions of the new marketing normal. This approach is in line with the "Marketing 5.0" paradigm, which promotes technological maturity linked to a human-centric value framework (Kotler et al., 2021).

Future-ready marketing strategies are likely to be characterized by a high degree of adaptability, technological-ethical balance, and an emphasis on the integration of data analytics, emotional intelligence, personalization, and transparency (Plangger et al., 2022; Alijoyo et al., 2025). The main limitations of this study include the limited scope of the respondents, the qualitative design, and the geographic anchoring of the research in a specific national context (the Czech Republic, 2024-2025), which limits the generalizability of the findings. Nonetheless, this work provides valuable insights into the real-world practice of digital marketing and makes a significant contribution to understanding the current challenges of technological transformation. Due to the formal limitations of a conference paper, only the most relevant sources are listed in the reference list, although the systematic review included a wider range of scholarly publications.

Although this study is anchored in the Czech business environment, its findings have potential applicability across other Central and Eastern European (CEE) markets, such as Slovakia, Poland, and Hungary. These economies share comparable structural characteristics, including the prevalence of SMEs, gradual digital transformation trajectories, and similar regulatory pressures under EU frameworks such as the GDPR and AI Act. The observed patterns of technology adoption, barriers related to infrastructure and expertise, as well as the hybridisation of traditional and digital marketing practices, are therefore likely to be relevant beyond the Czech Republic, while still requiring adaptation to local cultural and market conditions.

Conclusion

This study presents a systematic and multi-layered analysis of the impact of current digital technologies on marketing practice in the Czech business environment. By combining a systematic literature review with qualitative research among practitioners, the paper provides a robust understanding of how technologies such as artificial intelligence, big data, the Internet of Things, blockchain, augmented and virtual reality, and cloud computing are redefining marketing management paradigms. The findings empirically confirm that digital technologies no longer serve only a supporting function, but are a structural pillar of marketing strategies. Tools based on artificial intelligence and machine learning enable advanced personalization, data-driven decision making, and process automation, thereby fundamentally transforming customer interaction, campaign optimization, and brand value creation (Kotler et al., 2021; Guhl et al., 2024). At the same time, however, work highlights asymmetries in the ability to adapt, particularly for SMEs, which face limits in technological infrastructure, human resources, and organisational readiness (Surur et al., 2025; Yasar et al., 2025).

A crucial dimension that emerges from the research is the question of ethical integration of technology into marketing practice. With the growing influence of algorithmic decision-making structures, there is increasing pressure for transparency, privacy, and responsible management of the risks associated with personalisation. Legal regulation (e.g., GDPR or the EU AI Act) forms the necessary minimum here, but real trust and legitimacy can only be maintained by businesses through proactive ethical frameworks and value-anchored leadership (Mukhopadhyay et al., 2024, 2025; Sultana et al., 2016; Alijoyo et al., 2025).

The convergence of traditional and digital approaches to marketing is also an important conclusion. The work confirms the relevance of so-called hybrid models that combine human creativity with algorithmic efficiency and correspond to the concepts of "augmented marketing" or "marketing 5.0" (Kotler et al., 2021). This integration is particularly relevant in industries where customer experience, storytelling, and emotional engagement retain strategic weight (Fam et al., 2024).

Based on the analysis, several managerial recommendations can support the effective and sustainable integration of digital technologies into marketing practice. Foremost is the ethical adoption of technologies through internal guidelines ensuring transparency, fairness, and compliance with regulatory frameworks such as the GDPR and AI Act. Equally vital is investment in scalable digital infrastructure, including cloud-based and modular solutions, to bridge capacity gaps, particularly in SMEs. Leveraging artificial intelligence for personalised, value-driven communication, combining machine learning capabilities with human oversight, can enhance relevance while safeguarding customer trust. Finally, adopting hybrid marketing models that balance the efficiency of digital tools with human creativity can optimise operational performance and strengthen emotional brand connections.

The study makes an important contribution to the debate on the digital transformation of marketing in the Central European context. It opens up new research lines, especially in exploring algorithmic accountability, culturally conditioned technology acceptance, and the hybridization of human and artificial decision-making in marketing processes. Future research should also analyse the impact of these technologies on customer value creation, loyalty, and ethical credibility of brands in the long run. For practitioners, the article offers concrete guidance: successful digital transformation does not only require technological investment, but above all a change of mindset towards an interdisciplinary, ethically grounded, and customer-centric approach. In conclusion, the future of marketing will be defined by the ability to balance between performance rationality and human empathy, between automation and value anchoring. Companies that manage this complexity strategically and ethically will gain a decisive competitive advantage in the digital marketing era.

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