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Challenges of implementing AI marketing in e-commerce businesses in North Macedonia

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Abstract: This study investigates the challenges faced by e-commerce businesses in North Macedonia regarding the implementation of artificial intelligence (AI) marketing strategies. Engaging 115 active participants in the sector, the research identifies barriers that hinder the effective integration of AI marketing. Key areas of focus include technological integration, resource limitations, and the relationship between consumer expectations and AI-driven marketing initiatives. The findings reveal a significant level of satisfaction with AI marketing implementation, reflecting the resilience and adaptability of businesses in navigating these challenges. The analysis highlights the relationship between various factors—such as the level of AI implementation, AI readiness, digitalization level, marketing activities handling, and approaches to addressing challenges—on overall satisfaction. Insights from this study aim to guide e-commerce businesses in North Macedonia and similar contexts in successfully adopting AI in their marketing strategies. Furthermore, the research explores organizational readiness for AI marketing, emphasizing a proactive approach that contributes to the evolving integration of AI technologies in e-commerce practices.

Keywords: artificial intelligence, e-commerce, challenges, marketing strategies
JEL classification: M10; M31; L81; C88; D83

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Izzivi pri uvajanju trženja z umetno inteligenco v podjetjih za elektronsko poslovanje v Severni Makedoniji

Povzetek: Študija raziskuje izzive, s katerimi se soočajo podjetja za elektronsko trgovanje v Severni Makedoniji pri uvajanju strategij trženja z umetno inteligenco (UI). V raziskavi je sodelovalo 115 aktivnih udeležencev iz tega sektorja, pri čemer so bile identificirane ovire, ki otežujejo učinkovito integracijo trženja z UI. Ključna področja raziskave vključujejo tehnološko integracijo, omejitve virov ter odnos med pričakovanji potrošnikov in trženjskimi pobudami, ki temeljijo na UI. Rezultati kažejo na visoko stopnjo zadovoljstva z implementacijo trženja z UI, kar odraža odpornost in prilagodljivost podjetij pri premagovanju teh izzivov. Analiza izpostavlja povezavo med različnimi dejavniki – kot so raven uporabe UI, pripravljenost za UI, stopnja digitalizacije, način izvajanja marketinških aktivnosti ter pristopi k reševanju izzivov – in splošnim zadovoljstvom. Ugotovitve študije so namenjene usmerjanju podjetij za elektronsko trgovanje v Severni Makedoniji in podobnih okoljih pri uspešnem uvajanju UI v trženjske strategije. Poleg tega raziskava preučuje pripravljenost organizacij na trženje z UI in poudarja proaktiven pristop, ki prispeva k razvijajoči se integraciji tehnologij UI v prakse elektronskega poslovanja.

Ključne besede: umetna inteligenca, elektronsko poslovanje, izzivi, marketinške strategije

Introduction

Artificial Intelligence (AI) is a domain of computer science that deals with the development of intelligent computer systems capable of perceiving, analyzing, and reacting to inputs, explains Spector (2006). As a critical tool for marketers, AI eliminates human faults such as delays, biased approaches, and other minor flaws (Katyal, 2019). Marketers are familiar with terms like artificial intelligence, artificial neural networks, pattern recognition, big data, and automation. With these advancements, achieving high marketing results has become more attainable within companies. Salvador (2013) defines online commerce, or e-commerce, as commercial transactions conducted via electronic devices, involving the exchange of goods, services, or information. Expanding on this, Albertin (1999) describes e-commerce as encompassing the entire value chain of business processes within an electronic environment, driven by the extensive use of communication and information technology to achieve business objectives. Artificial intelligence is used by e-commerce companies, blogs, and several online social and media websites to analyze our online activity and recommend products and content to increase conversions and time spent on their sites (Bala and Verma, 2018).

In this paper, we explore the key challenges and opportunities for e-commerce businesses in North Macedonia in adopting artificial intelligence marketing strategies. Specifically, we investigate how factors such as AI implementation level, digital readiness, and organizational support influence satisfaction with AI integration and overall business performance. A globally customer-centric approach focused on customer needs plays a pivotal role in organizational growth, as Vetterli et al. (2016) stress. Research on digital and technological evolution in marketing has been considerably fast-paced, with Crittenden et al. (2019) emphasizing that researchers are exploring the influence of technological advancements on organizations' ability to manage customer needs and deliver offerings, as Kumar et al. (2019a) agree. However, only in recent years has research at the intersection of artificial intelligence (AI) and marketing gained more attention, with calls for further exploration of AI-related topics and their roles in marketing, as noted by Davenport et al. (2020) and Kumar et al. (2019b). AI is an emerging technology that helps organizations track real-time data to analyze and respond swiftly to customer requirements (Wirth, 2018). E-commerce represents the practice of buying and selling goods and services entirely online, serving various markets through a wide range of smart devices, including tablets and smartphones. As Bloomenthal (2022) explains, the e-commerce market is fiercely competitive, with everything from books to clothes and financial services available online. Numerous enterprises are integrating AI and machine learning into their operational processes. According to Russell and Norvig (2016), AI describes machines (computers) that simulate cognitive and affective functions of the human mind. This technology encompasses perception, reasoning, and actuation, combined through algorithms that enhance customer service and performance, as Belanche et al. (2020) explain. Paters et al. (2021) suggest that technologies collectively known as AI can perform tasks that require human intelligence.

The significance of AI in transforming the e-commerce landscape

The marketing industry can greatly benefit from artificial intelligence (AI). It supports the expansion of information and data sources, the development of complex and sophisticated algorithms, and the enhancement of software's data management skills. Brands and customers are interacting differently as a result of AI. The way this technology is used is very much influenced by the sort of business and website, states Wang et al. (2023). The field of artificial intelligence (AI) trains computers to understand and mimic human behavior and communication, states Zhang (2021). Implementers of AI-based marketing solutions have noted improvements in business model decisions, (Valter et al. 2018), new product

development (Chan et al. 2011), communication (Paschen, 2019), pricing (Calvano et al. 2019), sales management (Flaherty et al. 2018), advertising (Kietzmann et al. 2018), and personalized mobile marketing strategies (Tong et al. 2020). Experts have predicted the substantial effect of AI in three industries, i.e., retail, education, and health care, as per Ostrom et al. (2018). The retail industry with a high proportion of human work and concurrent low-profit margins is a natural fit for AI applications, especially e-commerce (Weberand Schütte, 2019). "Service AI," and if defined, means "configuration of technology to provide value in the internal and external service environments through flexible adaptation enabled by sensing, learning, decision-making, and actions," according to Bock et al. (2020). Therefore, service AI is not just about applying pre-programmed decisions; it has learning ability as well, points Makridakis (2017). AI treats human images like cookies, allowing for more personalized services based on customers' preferences. Some businesses are experimenting with facial recognition to diagnose their customers' moods and, as a result, make appropriate product recommendations, (Yang, 2021). AI can also be used for trend and product forecasting. By analyzing historical data on past trends and consumer behavior, AI algorithms can detect emerging trends and anticipate which products are likely to be successful in the future. The technology can then make predictions on what products are likely to be popular in the future based on this data. This can help eCommerce businesses make more informed decisions when it comes to product development, marketing, and other aspects of their operations (Niu, 2021). The concept of marketing has arrived at an evolutionary point where adaptation to technology is imperative and the impact of AI under each marketing mix component is obvious, i.e., for the product (hyper-personalization, new product development, automatic recommendations, etc.), price (price management, personalized dynamic pricing), place (convenience, speed, simple sales process, 24/7 chatbot support, etc.), and promotion (personalized communication, unique user experience, creating wow factor, minimizing disappointment, etc.), explain Jarek et al. (2019) and Dumitriu and Popescu (2020). The utilization of AI further provides a comprehensive understanding of customer decision-making processes. AI algorithms are capable of categorizing customers based on the data gathered, including the probability of their returning to place additional orders. These insights can be leveraged to optimize marketing efforts and effectively target the appropriate users at the opportune time. Additionally, AI has the potential to provide managers with pertinent information regarding customers who are at risk of departing by way of its ability to calculate the probable customer lifetime value. This knowledge can be utilized to engage with customers and persuade them to maintain a relationship with the company, in turn resulting in an increased customer lifetime value and heightened online sales, (Danielkievich, 2022).

The potential impact of AI marketing on e-commerce in North Macedonia

Technologies help increase the efficiency, quality, and cost-effectiveness of services provided by businesses, states Khrais L. (2020). The benefits of e-commerce as good opportunities for developing enterprises, attracting new customers and expanding markets, and improving financial performance have become even more evident during the extraordinary crisis conditions. In specific periods, when many retail stores were closed, e-commerce became the only source and supplier of necessary goods for a large part of the population and, simultaneously, an acceptable way of commercial business functioning, agree Tran (2021) and Amsari et al. (2022).

North Macedonia is no exception to e-commerce's growth, which the COVID-19 pandemic has accelerated. According to the Association for E-Annual Commerce's Report for North Macedonia for 2020, the value of online transactions increased by 56% in 2020 compared to 2017. According to the same report, the number of internet selling points (or "e-selling points") in North Macedonia expanded to 1,342 in September 2020, up from only 342 in 2018, as stated in the report by the Ministry of Finance (2020). With an expected increase of 4.3%

in 2023, the Macedonian eCommerce market contributed to the worldwide growth rate of 8.7% in 2023. Like in North Macedonia, global eCommerce sales are expected to increase over the next few years. Seven markets are considered by ECDB within the Macedonian eCommerce market. Hobby & Leisure is the largest market and accounts for 25.6% of the Macedonian eCommerce revenue. It is followed by electronics with 21.3%, fashion with 17.8%, furniture & homeware with 11.6%, care products with 9.4%, DIY with 9.1%, and groceries with the remaining 5.1%, as stated in the Ecommerce Market North Macedonia Report (2023). The North Macedonia e-commerce market is witnessing a growth rate of 16% over the forecast period from 2022 to 2027. North Macedonia's eCommerce market is expanding, but it remains small regarding local businesses selling and consumers shopping online. However, with regard to e-commerce, the National Bank reported a 61% increase in Internet transactions by citizens in the first semester of 2021. With regard to statistical performance and digital competitiveness, the collection of data based on the Digital Economy and Society Index (DESI) indicators has been estimated to be available and fully aligned in 87%, as stated in the Commission to the European Parliament report (2022).

Artificial intelligence manifests in diverse forms within the broader context of e-commerce, encompassing both the global landscape and the specific domain of e-commerce in North Macedonia. Artificial intelligence is able to predict how consumers will behave when shopping, what products selected customers will choose, and how the company can build and maintain the best possible relationships with them, (Soni, 2020). Furthermore, artificial intelligence helps e-commerce follow business trends, changing customer needs in the market. The company can gather a wide range of information, assess customers, and then adequately respond to their requirements and habits by providing quality services. Once a proper response is chosen, the business entity can expect increased customer comfort, increased satisfaction, and a balance of supply and demand mechanisms, (Khrais L. 2020). Artificial intelligence can be used not only to sell items but also to solve problems for clients. Chatbots can now interpret the natural conversations of people and learn from these interactions. Moreover, it is also possible to use chatbots in sales transactions. They can make better connections with customers than even people who intake suggestions during the sales process. For all businesses that are selling online in the global e-commerce industry, having chatbot software is now almost a necessity, and many customers don't even realize that they're talking with a computer, (Martinez, 2018). Artificial intelligence-based applications can begin taking care of routine errands. They can alter promotion and deal data for shoppers, states Jee (2016).

The author expresses as well that artificial intelligence algorithms can help retail and different organizations better deal with their stock. It can robotize refilling demands and advance supply chains. You can hand over your stock administration and inventory network choices to machine learning-based applications. While e-commerce has become ubiquitous in contemporary business landscapes, the academic discourse on this pervasive phenomenon is notably limited. Despite its widespread adoption as a fundamental component of modern commerce, there remains a conspicuous gap in the existing literature pertaining to comprehensive analyses and in-depth examinations of the multifaceted dimensions of e-commerce. The paucity of scholarly works on this topic poses a significant challenge in understanding the nuanced intricacies, emerging trends, and the evolving impact of e-commerce within various contextual frameworks. Consequently, there arises a compelling need for extensive and systematic academic exploration to bridge this scholarly gap and provide a more robust foundation for comprehending the complexities inherent in the e-commerce ecosystem.

1 Methodology

1.1 Data Collection

The data collection process for this study took place in March 2024. A specialized invitation was sent to e-commerce businesses in the North Republic of Macedonia, inviting enterprises registered in the region to participate in an online survey. The survey consisted of a structured questionnaire with twenty-five questions, estimated to take 5-7 minutes to complete. The questionnaire was divided into four major sections: the first two gathered basic information about the businesses and their AI implementation status, the third addressed AI marketing challenges, and the final section explored AI attitudes in e-commerce. In addition to the survey, a multiple linear regression was conducted using Minitab software. The dependent variable was satisfaction with AI marketing implementation, while the independent variables included the level of AI implementation, AI readiness, digitalization level, marketing activities handling, and the approach to addressing challenges. This regression analysis provided deeper insights into how these factors influence satisfaction with AI marketing.

1.2 Empirical Results

A total of 115 valid responses were collected from a successfully conducted survey comprising 25 questions. The main purpose of this survey was to thoroughly examine the distinctive challenges confronted by e-commerce enterprises in North Macedonia when embracing AI marketing. The focus was on illuminating complexities related to technological integration, resource constraints, and the dynamic interplay between consumer expectations and AI-driven marketing initiatives. The results of this survey, in conjunction with the theoretical framework, provide a foundation for developing ideas and concepts.

2 Discussion of results

The study received a total of 115 responses, out of which the nature of their e-commerce business and the following are the results: 46.09% are in B2C (business-to-consumer), 32.17% are in B2B (business-to-business), and 21.74% are in C2C (consumer-to-consumer). Each of the respondents was asked regarding their current role in the e-commerce company, and the results show that the majority of them are Chief Operations Officers (COO), which represents 33.04% of the total. Second on the rankings are e-commerce managers with 24.35%. Third on the rankings are Chief Marketing Officers (CMOs) with 20%. Ranked fourth in the survey are digital marketing managers, comprising 13.04% of the respondents. Following closely, CEOs/founders hold the fifth position, representing 6.96%. Occupying the last spot in the rankings are Chief Technology Officers (CTOs), with a modest percentage of 2.61%. In terms of business longevity, 49 out of the 115 respondents have been running their e-commerce enterprises for 3-5 years, while 31 respondents have a business history of 5+ years. Additionally, 30 respondents have been in operation for 1-3 years, and a smaller group of 5 respondents has been running their e-commerce business for less than 1 year.

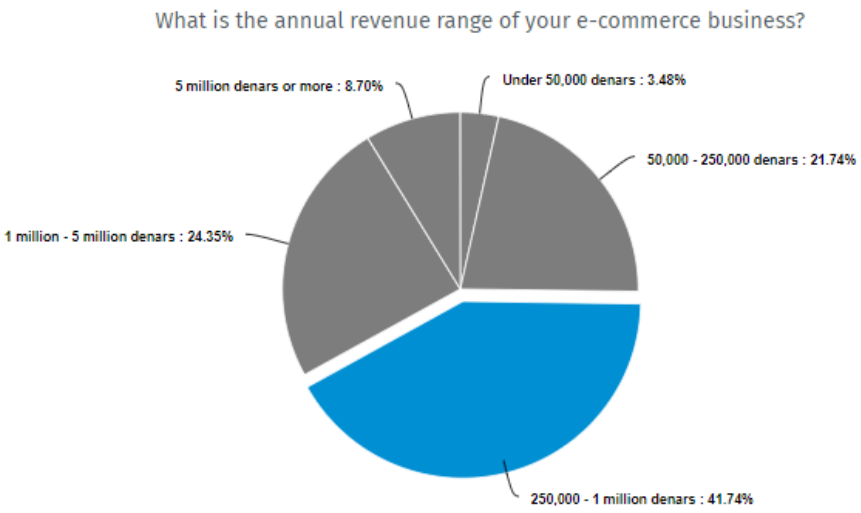

Figure 1: Q3 - What is the annual revenue range of your e-commerce business?

The results show that a significant portion of e-commerce businesses have an annual revenue between approximately €4,036 and €16,186, making up a substantial segment of the respondents. Following this, businesses with revenues ranging from approximately €16,186 to €80,932 make up the next largest group. A smaller but notable portion of businesses reported annual revenues between approximately €809 and €4,036. A few businesses fall into the higher revenue category, exceeding approximately €80,932 annually, while the smallest group consists of businesses generating under approximately €809 per year. In terms of workforce size, the majority of respondents reported having mid-sized teams of 11-50 employees, followed by those with slightly larger teams of 51-100 employees. Some businesses operate with smaller teams of 1-10 employees, while a few reported having over 100 employees. A small fraction are solo entrepreneurs managing their businesses independently. The primary sectors represented in the survey include fashion and apparel, which dominates as the largest industry, followed by the beauty and personal care sector. Other notable sectors include home and furniture, electronics, and automotive. When it comes to target markets, more than half of the respondents focus on the national market. A significant number cater to local markets, while a smaller portion targets international customers, reflecting the diverse operational scope of these e-commerce businesses.

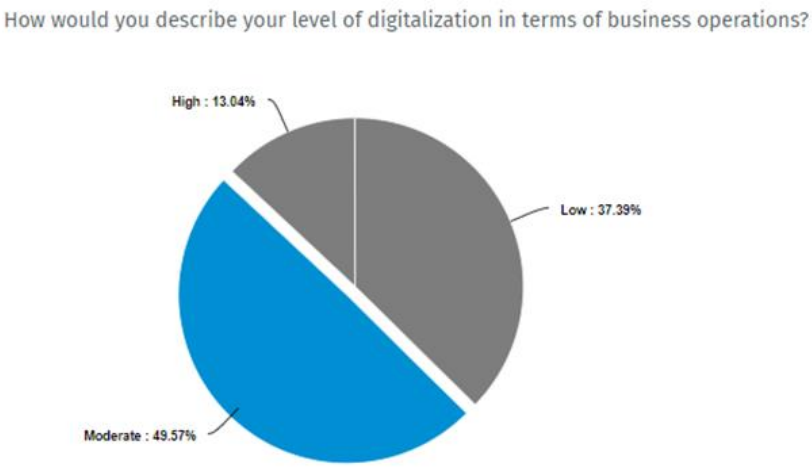

Figure 2: Q7 - How would you describe your level of digitalization in terms of business operations?

Nearly half of the respondents believe their businesses are operating at a moderate level of digitalization, while a significant portion consider themselves at a lower level. Only a smaller fraction see their operations as highly digitalized. When it comes to online sales, over a third of businesses generate a substantial portion of their revenue through digital channels, while others report a more modest share. A small but notable group relies almost entirely on online sales. Marketing activities in e-commerce businesses vary, with most respondents relying on in-house teams. Others use a combination of in-house and outsourced teams, while some depend entirely on external agencies or lack dedicated marketing support altogether. Regarding AI adoption, more than half of the respondents are in the early stages of implementing AI technologies, while others have made partial progress. A minority have fully integrated AI, and a few have yet to begin. AI is most commonly applied in customer service, with other uses including chatbots, inventory management, personalized recommendations, and fraud detection. Challenges during AI implementation are common, with high costs being the most frequently cited issue. Other challenges include a lack of skilled personnel, difficulties with system integration, data privacy concerns, and resistance from employees. Satisfaction with AI performance in e-commerce operations varies, with many respondents expressing general satisfaction. However, a smaller number are either neutral or dissatisfied. Most businesses allocate a small portion of their budget to AI initiatives, with only a few committing more significant resources. Finally, the majority of respondents view AI marketing as a very challenging aspect of their business. Others find it moderately or somewhat challenging, while only a small fraction consider it not challenging at all.

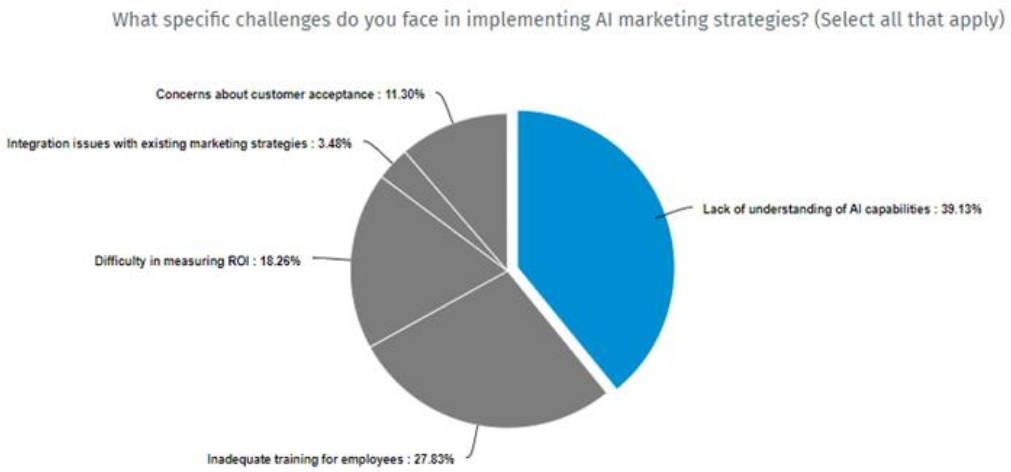

Figure 3: Q16: What specific challenges do you face in implementing AI marketing strategies?

Respondents highlighted several key challenges in implementing AI marketing strategies. A significant number expressed difficulty in understanding AI's full capabilities, while others pointed to inadequate training for employees, which hinders effective use of AI tools. Many also struggle with measuring the return on investment (ROI) from AI-driven marketing efforts. Concerns over customer acceptance of AI-generated marketing strategies were also noted, with a smaller group citing issues with integrating AI into their existing marketing frameworks.

Regarding confidence in the accuracy and reliability of AI-generated insights for decision-making, a substantial portion of respondents expressed a high level of confidence, while others felt generally confident in its effectiveness. Some were neutral, neither fully

convinced nor dismissive of AI's accuracy, while a minority expressed doubts, showing varying degrees of skepticism about its reliability.

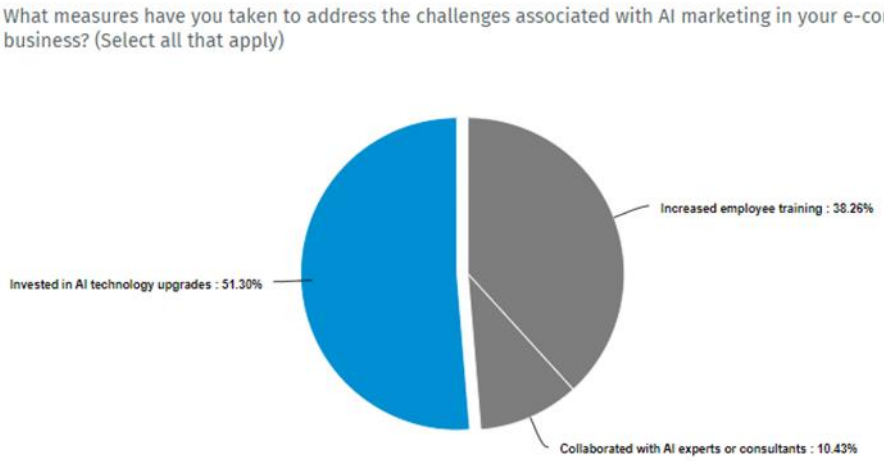

Figure 4: Q19 - What measures have you taken to address the challenges associated with AI marketing in your e-commerce business? (Select all that apply)

The last question in Section 3 focused on the measures respondents have implemented to tackle the challenges associated with AI marketing in their e-commerce businesses. The results reveal that a significant portion of participants have prioritized upgrading their AI technology, while others have enhanced employee training programs. Additionally, some have sought collaboration with AI experts or consultants to navigate these challenges effectively. The next question assessed the perceived impact of AI marketing on the overall performance of their e-commerce operations. A clear majority indicated that they experienced a positive effect from AI marketing, while a smaller group viewed its impact as neutral.

The final segment of the study aimed to explore the readiness of organizations to adopt AI marketing strategies. The responses indicate a varied landscape of readiness among participants. Many expressed confidence in their preparedness, while others remained neutral, suggesting a cautious approach. A smaller number acknowledged they were not fully ready, indicating a spectrum of readiness levels that reflects the diverse experiences of e-commerce businesses in integrating AI.

Figure 5: Q21. How would you rate your organization's readiness for adopting AI marketing strategies?

Respondents shared their insights on employee perceptions of AI marketing as a positive addition to their roles. Many expressed a favorable view, with a significant portion feeling positively about AI's impact, while a smaller group reported strong positivity. A notable number remained neutral, and a few individuals had negative feelings toward its integration. When asked how their organizations have fostered a culture that embraces AI marketing technologies, responses varied. A considerable number of businesses implemented awareness programs and training initiatives, while others encouraged cross-functional collaboration to enhance understanding and acceptance. Some organizations recognized and rewarded achievements in AI adoption, demonstrating their commitment to this transition. A few opted to create specialized task forces focused on AI. In terms of effectively communicating the benefits of AI marketing to customers, many respondents took a neutral stance. Others found their organizations to be effective or very effective in these efforts, although a small portion felt that their communication strategies fell short. Overall, these insights reflect a complex landscape of attitudes and strategies surrounding AI marketing in the workplace.

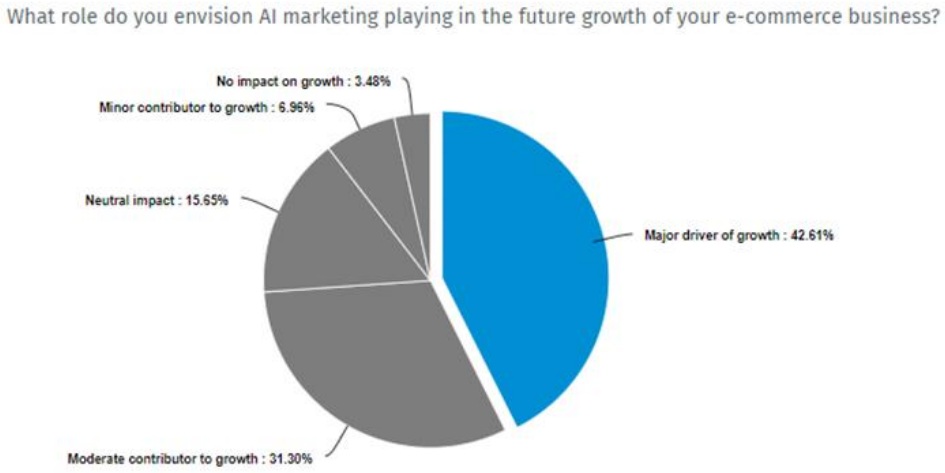

Figure 6: Q25. What role do you envision AI marketing playing in the future growth of your e-commerce business?

The final question in Section 4 is designed for short answers to collect unbiased opinions from respondents. Among the responses, a notable portion believe that AI marketing will significantly drive growth in their e-commerce business, while others view it as a moderate contributor. A smaller percentage remain neutral, anticipate only a minor contribution, or assert that it will have no impact on their business growth. To further explore these perspectives, a multiple linear regression analysis was conducted using the statistical software Minitab® 19.1.1 (64-bit). The dependent variable, representing satisfaction with AI marketing implementation, was derived from responses to specific questions (Q13, Q17, Q19, Q21, and Q24) and was transformed using a Box-Cox transformation with $\lambda=0$ to meet the necessary assumptions for analysis. Initially, the study examined nineteen independent variables. However, through a process of backward elimination, which involved removing variables that did not exhibit a statistically significant association (p-values greater than 0.05), five independent variables remained for further analysis. This rigorous approach ensures that the findings are both robust and meaningful, allowing for a clearer understanding of the factors influencing satisfaction with AI marketing implementation.

The final result of the multiple linear regression is:

$$\begin{aligned}\text{Ln (Satisfaction)} = {} & 0.819 - 0.1260(Q10) + 0.1061(Q20) - 0.1097(Q7) - 0.0820\ \textit{In-house marketing team} \\ & + 0.250\ \textit{No marketing activity handler} - 0.0426\ \textit{Outsourced marketing agency} \\ & - 0.0672\ \textit{Increased employee training} - 0.1802\ \textit{Invested in AI technology upgrades}\end{aligned}$$

The independent variables are Q10 (implementation level), Q20 (AI readiness), Q7 (digitalization level), Q9 (marketing activities handling), and Q18 (addressing challenges). The analysis of the variance table is shown below where p-values of each term are less than 0.05 which proves our independent variables have statistically significant association with the satisfaction with AI marketing implementation.

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	8	6.7243	0.84054	14.71	0.000
Q10	1	0.5693	0.56931	9.96	0.002
Q20	1	0.5339	0.53391	9.35	0.003
Q7	1	0.4441	0.44406	7.77	0.006
Q9	3	0.6564	0.21879	3.83	0.012
Q18	2	0.4934	0.24669	4.32	0.016
Error	106	6.0559	0.05713		
Lack-of-Fit	55	3.7921	0.06895	1.55	0.057
Pure Error	51	2.2639	0.04439		
Total	114	12.7802			

Table 1: Analysis of Variance for Independent Variables Affecting Satisfaction with AI Marketing Implementation

The coefficients table is shown below where the coefficients and P-values are shown.

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	0.819	0.185	4.43	0.000	
Q10	-0.1260	0.0399	-3.16	0.002	1.74
Q20	0.1061	0.0347	3.06	0.003	1.41
Q7	-0.1097	0.0394	-2.79	0.006	1.39
Q9					
In-house marketing team	-0.0820	0.0617	-1.33	0.187	1.88
None	0.250	0.123	2.04	0.044	1.96
Outsourced marketing agency	-0.0426	0.0741	-0.57	0.567	1.82
Q18					
Increased employee training	-0.0672	0.0809	-0.83	0.408	3.11
Invested in AI technology upgrades	-0.1802	0.0782	-2.31	0.023	3.07

Table 2: Coefficients and P-Values for Predictors of Satisfaction with AI Marketing Implementation

For the independent variable Q10 (implementation level) which is measured from 1 – not implemented to 4 – fully implemented, the coefficient is negative which means as AI technologies are fully implemented for e-commerce business, the satisfaction with AI marketing implementation goes down.

This association is illustrated below using a scatterplot:

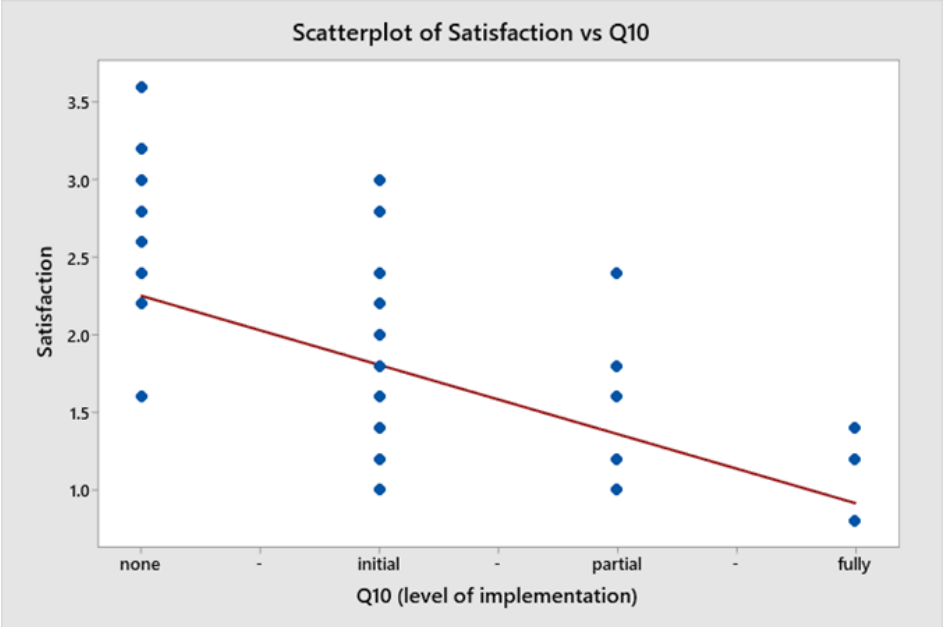

Figure 7: Scatterplot of Satisfaction vs Q10

For the independent variable Q20 (AI readiness) which is measured from 1 – very ready to 5 – not ready at all, the coefficient is positive which means as organizations' are not ready, the satisfaction with AI marketing implementation goes up.
This association is illustrated below using a scatterplot:

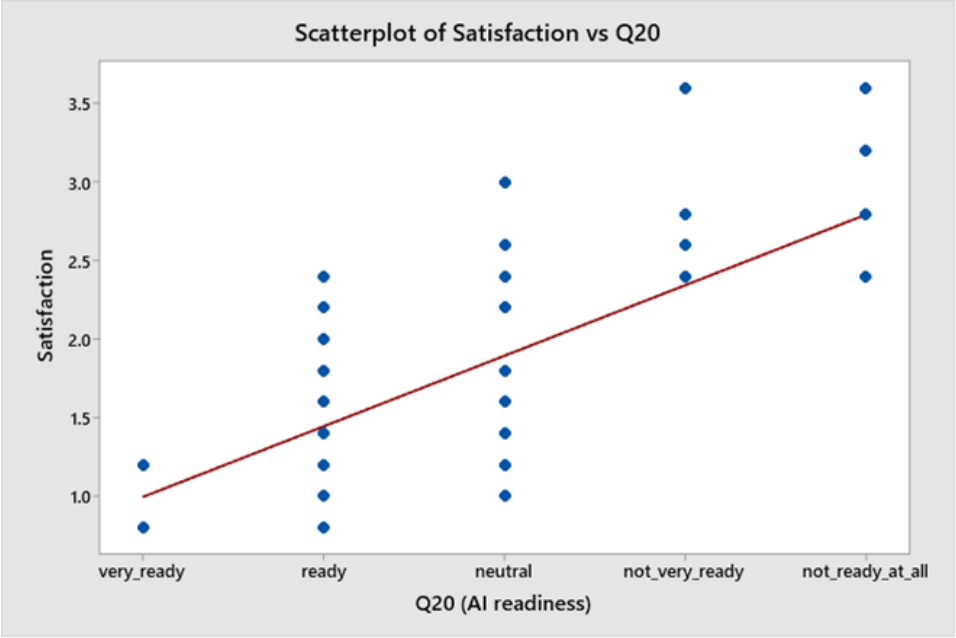

Figure 8: Scatterplot of Satisfaction vs Q20

For the independent variable Q7 (digitalization level) which is measured from 1 – low to 3 – high, the coefficient is negative which means as organizations' digitalization level goes up, the satisfaction with AI marketing implementation goes down.
This association is illustrated below using a scatterplot:

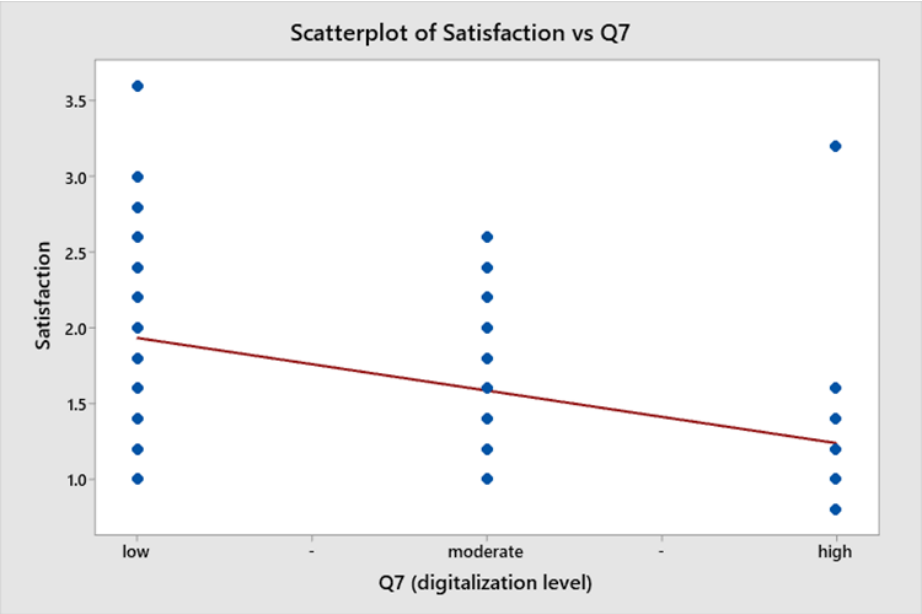

Figure 9: Scatterplot of Satisfaction vs Q7

For the independent variable Q9 (marketing activities handling), the categories with coefficients arranged in descending order are none, combination of in-house and outsourced, outsourced marketing agency, and in-house marketing team. This means organizations with no marketing team/agency is associated with more satisfaction with AI marketing implementation than with the others. The descending order corresponds with lesser satisfaction as we go down the order.

For the independent variable Q18 (addressing challenges), the categories with coefficients arranged in descending order are collaborated with AI experts or consultants, increased employee training, and invested in AI technology upgrades. This means organizations with collaborations with AI experts or consultants is associated with more satisfaction with AI marketing implementation than with the others. The descending order corresponds with lesser satisfaction as we go down the order. The Pareto chart is shown below in which the terms are arranged in descending order where terms on top have more effect on the satisfaction with AI marketing implementation.

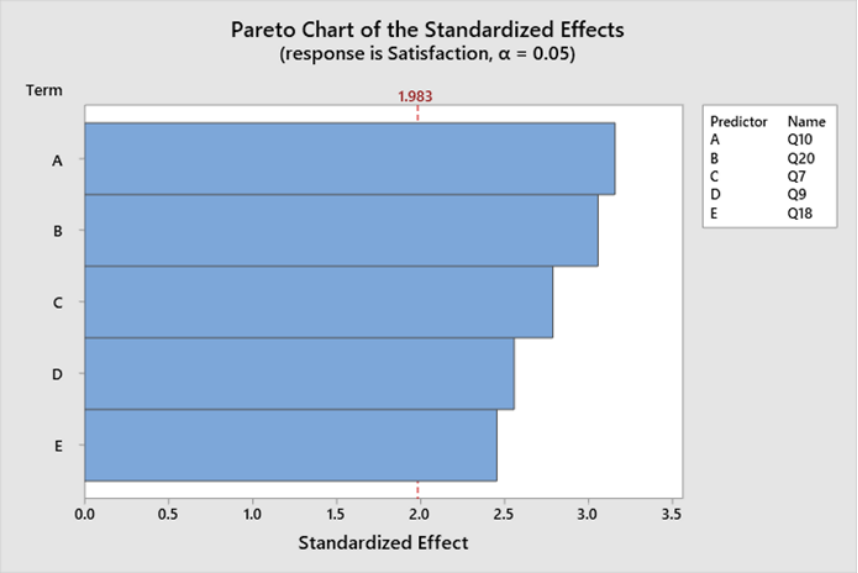

Figure 10: Pareto Chart of the Standardised Effects

The multiple linear regressions adjusted R-square is 49.04% which means the model explains 49.04% of the satisfaction with AI marketing implementation variability.

3 Method

Categorical predictor coding	(1, 0)
Box-Cox transformation	
Rounded λ	0
Estimated λ	0.227425
95% CI for λ	(-0.295075, 0.735925)

Model Summary for Transformed Response

S	R-sq	R-sq(adj)	R-sq(pred)
0.239021	52.62%	49.04%	45.19%

Durbin-Watson Statistic for Transformed Response

Durbin-Watson Statistic =	2.00540

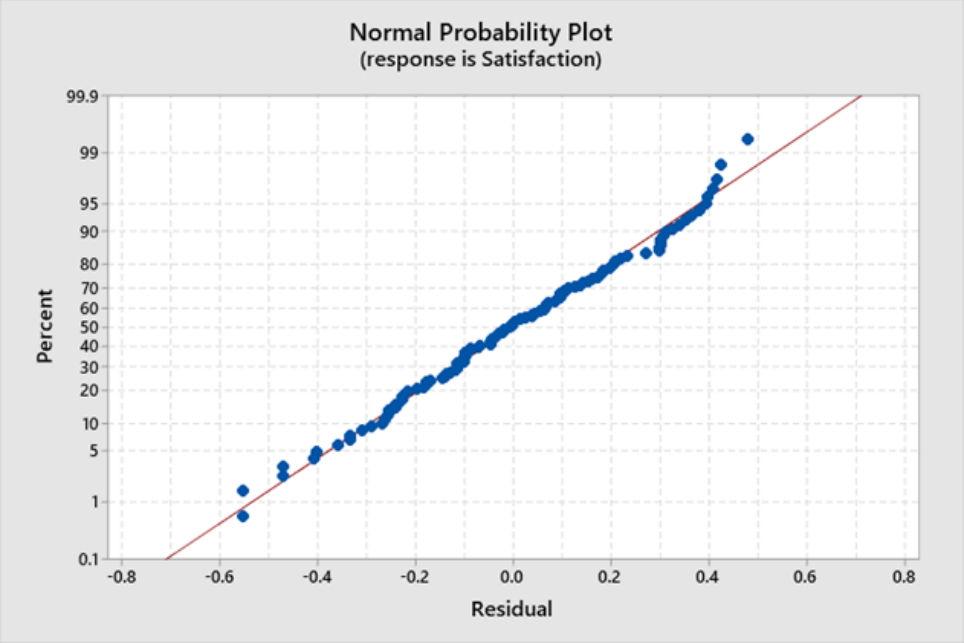

Figure 11: Normal Probability Plot

3 Conclusion

In conclusion, the study offers valuable insights into the e-commerce sector in the region, revealing a diverse mix of businesses across B2C, B2B, and C2C models. Key decision-makers such as COOs, e-commerce managers, and CMOs participated, reflecting a balanced representation in the industry. Many businesses have been operating for several years, indicating a degree of stability, while the fashion and beauty sectors emerged as primary focus areas.

The findings suggest that a significant number of respondents are in the early stages of AI adoption, with applications ranging from customer service to inventory management. However, challenges such as high costs, the need for skilled personnel, and data privacy concerns were prevalent. Despite these obstacles, many respondents reported satisfaction with the performance of AI technologies in their operations. While there is a general confidence in AI-generated insights for marketing decisions, perceptions of the challenges associated with AI marketing reflect a landscape of uncertainty. Organizations are taking proactive steps to address these issues through investments in technology and employee training. Overall, the study highlights a readiness among e-commerce businesses to embrace AI marketing strategies, emphasizing the dynamic relationship between AI technologies and e-commerce in North Macedonia.

4 Recommendations for further research

The current study provides a thorough understanding of the complex interconnections between AI technologies and e-commerce in North Macedonia. However, there are several areas that warrant further exploration in future research. Firstly, a detailed investigation into the evolving challenges encountered during AI implementation could yield valuable insights for developing more effective mitigation strategies. Additionally, a longitudinal study tracking the progress of e-commerce businesses in response to technological advancements and market shifts would offer a dynamic perspective. Moreover, future research could delve into the nuanced impact of AI marketing strategies on specific industry sectors within the region. A comparative analysis across varying business sizes and revenue brackets may reveal differing patterns of AI adoption and performance. Understanding the long-term sustainability and scalability of AI technologies in the context of North Macedonian e-commerce businesses represents another fruitful area for exploration. Exploring the interplay between AI technologies and emerging trends such as sustainability, ethical considerations, and evolving consumer behaviors could contribute to a forward-looking understanding of the challenges and opportunities within the e-commerce landscape. Lastly, a cross-cultural examination, extending beyond North Macedonia, could offer a broader perspective on the global implications of AI implementation in diverse e-commerce ecosystems. These suggested directions aim to propel future research towards a more nuanced understanding of the evolving relationship between AI technologies and e-commerce dynamics.

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