Emergence of the Algorithmic Promotional Mix Enhanced by Automation & Machine Intelligence (Generative AI-Driven IMCs -Benefits & Drawbacks-)

Tarek Guendouz [*1]
[1] University of Tabuk (Kingdom of Saudi Arabia), tguendouz@ut.edu.sa

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Abstract:
This study addresses a Contemporary Marketing Issue of critical importance, both now and in the future. It discusses Integrated Marketing Communications (IMCs) tools enhanced by Generative Artificial Intelligence (G-AI) applications and software. The Promotional Mix in the era of Digital Computing algorithms and Cyber-Physical Systems (CPSs) is replete with strategic opportunities and gains, at the forefront of these are Hyper-Personalization of advertising messages and optimization of promotional campaigns. While also facing significant challenges and risks, especially ethical and legal concerns and invasion of privacy. The research papers conclude that Machine Learning (ML), Deep Learning (DL), Big Data Analysis (BDA), Natural Language Processing (NLP), Large Language Models (LLMs), Artificial Neural Networks (ANNs), Virtual Assistants (VAs), Chatbots, and other Disruptive Technologies and Emerging Innovations are coming in conjunction with the Fourth and Fifth wave of the Industrial Revolution (Industry 4.0 & 5.0).
Keywords: Integrated Marketing Communications; Promotional Mix; Generative Artificial Intelligence

1. Introduction:

1.1 Research Background:

Artificial Intelligence (AI), as an emerging term derived from computer science, is, in its essence and content, an integrated and coordinated electronic and cloud-based system of various digital and cyber technologies in a virtual computing environment (Generative Artificial Intelligence; Machine Learning (ML) algorithms; Natural Language

* ***Corresponding author***

Processing (NLP); Chatbots; Augmented Reality (AR) & Virtual Reality (VR); Big Data Analytics (BDA); Predictive Analytics; Internet of Things (IoT) ...), which works in a harmonious and coherent manner to enable computers, automated machines, and intelligent robots to sense, think, understand, act, and learn at human-like levels of intelligence, mimicking the processes, capabilities, and potential of the human mind in interpreting, comprehending, adapting, and self-correcting.

The importance of modern AI software solutions in the dynamic world of economics, investment, finance, and business, and in complex administrative, organizational, production, financial, accounting, and marketing decision-making, lies in the fact that AI tools possess the highly precise ability to achieve corporate goals and aspirations, whether in increasing sales and maximizing profits, or reducing costs and saving time by improving customer service, supply chains, e-commerce, marketing communications, pricing policies, and other elements that have become part of the AI landscape and the tremendous scientific development and progress in the fields of Information Technology (IT), Telecommunications (ICT), and Internet. Today, AI is the cornerstone of managing and transforming massive amounts of data into useful information, elevating it to knowledge that plays a very prominent role in achieving a Sustainable Competitive Advantage (SCA) (efficiency, effectiveness, flexibility, quality, speed, reputation, etc.).

Integrated Marketing Communications (IMC), along with rich promotional and advertising activities, occupy a prominent and respected position within the components and content of a marketing program. The value of these consistent communication channels and outlets increases day by day, particularly with the repercussions of digital, computer, and cyber globalization, the proliferation of internet technology and social media, and the implications of the age of imagination, intelligence, and the highly complex scientific and technical c revolution. These revolutions bring with them numerous gains and opportunities that must be exploited, while also generating threats and dangers that must be avoided and evaded. Accordingly, marketing communication tools and methods are more likely than ever to interact and integrate with these terrifying and accelerating developments, and to effectively adapt to these difficult and ambiguous situations and circumstances. This is especially true given that promotional efforts, in their contemporary approach, focus on harmony and cohesion in

performance and achievement, in order to deliver value and build loyalty among the target audience.

In addition to the above, consistent and synergistic marketing and promotional communications, based on databases and relationship management and partnerships with target segments and audiences, derive their importance within the 4Ps of tactical marketing, whether traditional or digital (i.e., physical and virtual marketing). This is because they are the backbone and cornerstone of driving and activate effective demand by convincing existing and potential customers, attracting them to the brand with its unique advantages, exceptional features, and distinctive messages compared to competitors. Thus, the organization achieves its goals and reaches its aspirations in overcoming challenges, which is the key to sustainable success, winning markets, and seizing market shares from competitors, both now and in the future.

1.2 Research Dilemma:

Everyone has noticed the growing and escalating role of Artificial Intelligence (AI), Automation, and Machine Learning (ML) algorithms as a fundamental pillar in changing the rules of competitive games in the world of finance and business, and the beating heart of commercial and sales decision-making in this heated era of the information age and science fiction (Metaverse). Currently published research and surveys have proven that AI plays a pivotal role and has tangible impacts in automating IMC. This, in turn, enhances the outputs and outcomes of the marketing communications process and improves the performance of online and offline promotional activities to reach wider markets efficiently and effectively. The implementation and execution of IMC strategies powered by AI & ML focuses on bridging marketing gaps by exploiting the science of analyzing, sorting, processing, and organizing massive, unstructured data sets of shoppers to accurately predict their future purchase choices and improve the Customer Experience (CX) and journey. This, in turn, results in clear and actionable insights into the current and prospective customer base, a task that was previously considered insurmountable. Which would be a very complex and HR-intensive process.

1.3 Research Value:

Amidst the tremendous scientific development and technological progress in the fields of information, communications, transportation,

networks, systems, Internet, and Automation, Artificial Intelligence (AI) is one of the most important characteristics of the e-economy, sustainable development, and quality of life. It is a prominent feature and cornerstone of the modern digital and cyber age. It is a cumulative asset of computer science and applications. This intelligent and useful technology, a valuable algorithmic tool in this computing and cloud environment, with its efficient and effective software solutions, has sparked a tremendous revolution, expanding exponentially and growing steadily across all aspects of contemporary life. Its importance lies in enabling businesses, governments, and societies to perform their daily tasks more easily, quickly, and with superior quality and precision. It is automated to minimize human effort and manual processes, in addition to its ability to perform predictive analysis of big data.

In a related context, the Integrated Marketing Communications system and process is considered a modern approach and a natural extension of the traditional promotional mix tools and methods. It represents, at its core, effective methods and ways to persuade the target audience of the quality and identity of brands. This leads to harmony and synergy in the planning, implementation, and evaluation of all communication activities and promotional efforts in a consistent and coherent manner. This is achieved by crafting the appropriate message and selecting the optimal medium or channel. Proper coordination and systematic integration of advertising campaigns, sales force skills, public relations, direct marketing, sales promotion, and others will inevitably result in improved and increased marketing performance in terms of efficiency and effectiveness indicators. Not surprisingly, automating the physical and digital components and content of marketing and promotional communications, through the use of computer science, Information Technology (IT), Artificial Intelligence solutions, Machine Learning (ML) algorithms, Big Data Predictive Analytics, and other tools, will inevitably result in Hyper-Personalization, positive interaction, and beneficial feedback. This, in turn, will result in the desired competitive advantage, translated into customer satisfaction, corporate reputation, and profit streams.

2. Artificial Intelligence ... Is It a Blessing or a Curse? (Highlighting Its Pros and Cons)

2.1 An Introduction to Artificial Intelligence and its Penetration into the Daily Lives of Countries and Societies

John McCarthy coined the term Artificial Intelligence in 1950. AI is

defined as the modeling, simulation, and imitation of the human mind's intelligence processes—perception, reasoning, analysis, understanding, inference, comprehension, and future prediction—through Machine Learning (ML), particularly in laptops, robotics, drones, smartphones, scanners, facial recognition, and other devices. AI requires a range of knowledge and expertise in mathematics, probability, computer science, psychology, linguistics, philosophy, and many other fields. It is an interdisciplinary science with multiple approaches.

Accordingly, Artificial Intelligence has become an increasingly integral part of daily life. It is a broad branch of computer science, and one of the methods that has caused a global uproar and revolutionized manufacturing, marketing, finance, supply chain management, and the analysis and processing of large amounts of data, among others. Machine and Deep Learning (ML & DL) algorithms have helped model and solve many difficult and complex problems and enhance critical decision-making in all areas of the industrial and agricultural economy, stock exchanges, transportation, infrastructure, construction, traffic regulation, healthcare, academia, and others.

There are many real-world applications and uses of AI systems today. Here are some of the most common examples, which have proven highly successful:

- Internet of Things (IoT).
- Generative AI.
- Augmented & Virtual Reality technology.
- Natural Language Processing (NLP), such as Chatbots.
- Automatic speech recognition, speech-to-text conversion, or voice search, such as Siri.
- Recommendation engines used by YouTube and Amazon.
- Development of self-driving cars, such as Google's Waymo vehicle, etc.

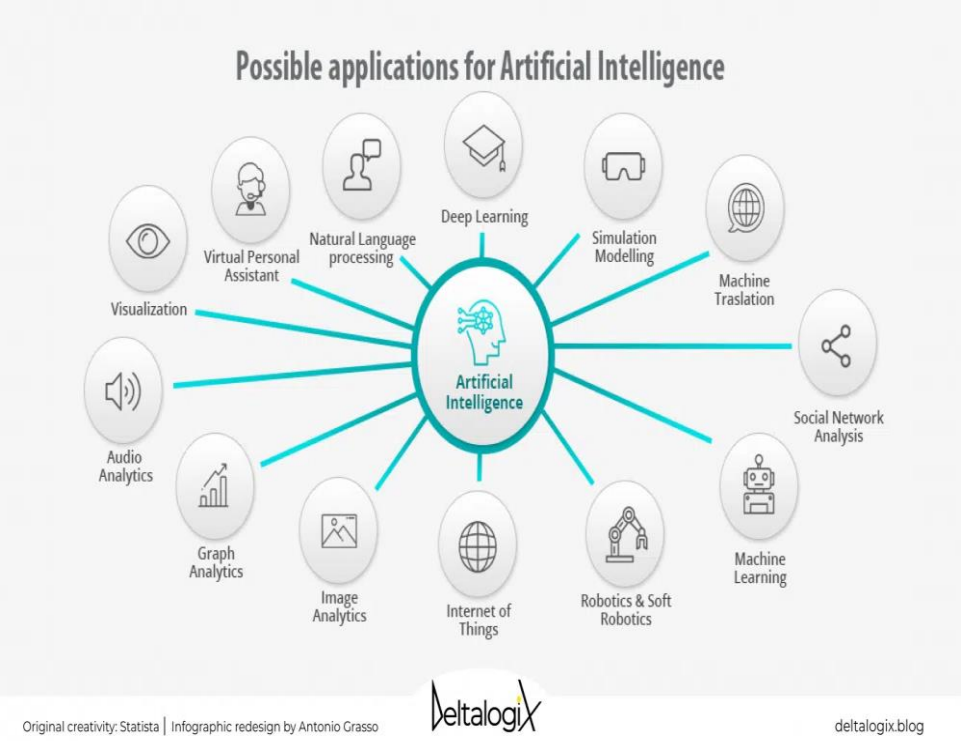
Artificial Intelligence is becoming increasingly important, particularly in detail-oriented jobs. It also reduces the time required for data-intensive tasks, where programmed machines are responsible for completing daily tasks. It is therefore a strength and a winning card for improving productivity, efficiency, and effectiveness while simultaneously reducing the likelihood of human error. Despite all these advantages of Artificial

Intelligence, there are some drawbacks and shortcomings recorded against it, such as its high cost (i.e., development costs), its requirement for in-depth technical expertise, the inability to generalize from one task to another, and the possibility that automated machines and robots could replace human jobs.

A prime example of companies using specialized hardware and software for advanced AI algorithms is Google, for example, a model company with exceptional performance in understanding how its customers use its products and services and working diligently to improve them. Uber, an American multinational online technology company, has developed marketplaces that operate on the Uber taxi app, which allows smartphone users to request a driver for transportation within specific areas. The app, which is based on Google Maps and GPS, is a satellite navigation system.

(See: Zhang, W., & Zeng, M. 2024; Helbing, D. 2019; Pisica, A. I., et al. 2023; Khanzode, K. C. A., & Sarode, R. D. 2020; Thomas, A., & Kuppasani, P. R. 2025; Kaplan, A., & Haenlein, M. 2020; Groumpos, P. P. 2023; Pannu, A. 2015; Zhang, Y., et al. 2014; Sestino, A., & De Mauro, A. 2022; Bharadiya, J. P., et al. 2023; Britannica Team. 2023; IBM Team. 2023; Laskowski, N., et al. 2023; HVPM Scientific Research. 2015; Baum, H. 2023; Boucher, P. 2020; Schwartz, B. 2022; Koetsier, J. 2018).

Fig.1. Artificial Intelligence: the applications that increase business productivity



Source: Di Nardo, C. 2021

2.2 The Rise of AI ... Accelerating Growth Rates and Steady Spread in the Age of Digital Computing

Following the Generative AI boom, new forecasts from the International Data Corporation's Worldwide AI Spending Guide indicate that global AI spending, including software, hardware, and services for AI-focused systems, will exceed $300 billion in 2026, representing a compound annual growth rate (CAGR) of 26.5% over the 2022-2026 forecast. This is four times the five-year CAGR of 6.3% for worldwide IT spending during the same period.

In the 2023 report by Tortoise Intelligence, which measures the AI Index, USA leads the pack with a score of 100. This makes sense because the largest players in Generative AI currently are American companies such as Google, Microsoft, and, most notably, OpenAI. In second place is PRC, which scored 62 points out of 100. Both USA & PRC have maintained their first and second place rankings since 2020. However, there has been a shift in the rankings of other countries

A PricewaterhouseCoopers survey found that 85% of CEOs agree that

AI will significantly change the way they do business in the coming years, even if AI penetration into businesses is not yet impressive. A 2017 PwC report also predicted that investments in AI development will lead to a 14% increase in global GDP by 2030. According to Tractica, the global AI software market will reach $118.6 billion in annual revenue by 2025.

The Pew Research Center surveyed 10,260 Americans in 2021 about their attitudes toward Artificial Intelligence. The results found that 45% of respondents were equally excited and concerned, and 37% more concerned than excited. Additionally, more than 40% said they considered self-driving cars harmful to society.

(See: IDC Team. 2022; Tortoise Media Team. 2023; Ortiz, S. 2023; Business Wire Team. 2019; PwC Report. 2017; Funk, C., & Rainie, L. 2022).

Fig.2. Top 10 Countries in the Global AI Index 2023



Source: Stanford HAI staff. 2024

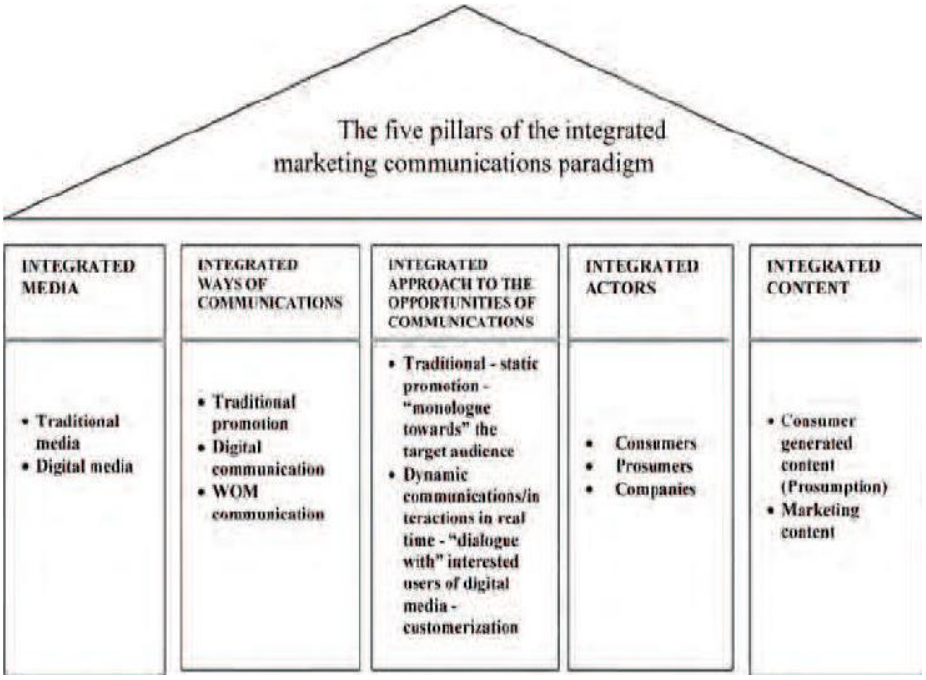
3. AI-Powered Integrated Marketing Communications (A Brief Overview of the Birth of the Algorithmic Promotion Era)

3.1 Unlocking the Power of the Integrated Marketing Communications and Promotional Industry

Philip Kotler, the world-renowned expert on modern marketing, says that Integrated Marketing Communications is a way of looking at the entire marketing process from the customer's perspective. Accordingly, the central and pivotal goal of the interdependent marketing communications system that combines old and new methods is to eliminate the consequences of conflict and clash in promotional campaign messages. These contradictions lead to confusion in the minds, perceptions, and understandings of the target audience, distorting the meaning and content of the media material, making it unstable, fluid, and flexible, and failing to achieve the desired effects and expected goals. Hence, this methodology was developed, based on unifying communication efforts and linking promotional activities in an appropriate, and sequential manner, creating coherent, unified, and cohesive messages that reinforce each other, and sending clear, consistent, and cohesive signals and symbols that achieve the intended purpose and the outlined result regarding the quality of the Customer Experience (CX) and brand identity.

(See: Duncan, T., & Caywood, C. 2013; Juska, J. M. 2021; Blakeman, R. 2023; Patrianti, T., et al. 2022; Rehman, S. U., et al. 2022; Nesterenko, V., et al. 2023; Rachmawati, M. A., & Afifi, S. 2022; Gordon-Isasi, J., et al. 2021; Keller, K. L. 2016; Kushwaha, B. P., et al. 2020; Ghale, K., & Singh, D. D. 2015; Dumouchel, L. E. 2025; Marbun, B. 2025; Davenport, D. 2023; The Indeed Editorial Team. 2023; Study Smarter Team. 2023).

Fig.3. Integrated Marketing Communications paradigm in digital environment



Source: Rakić, B., & Rakić, M. 2014

3.2 Harnessing AI for Real-Time Integrated Marketing Communications and Promotional Activities

The development of AI, Automation, and ML solutions, due to their inferential, deductive, and self-correcting nature, enables them to mimic human intelligence processes for the IMC. They are dynamically integrated with Predictive Analytics by modeling customer recommendation engines, which will subsequently influence marketing mix decisions. These technologies can evaluate speech to extract sentiment, develop visual representations of social media trends, and process raw, unstructured data to generate predictions. AI & ML tools such as Augmented Reality (AR) & Virtual Reality (VR), and ChatGPT for conversations; Canva for creating templates, graphics, and shapes; Synthesys for text-to-speech; Synthesia.io for video and visual presentation design; and Copy.ai, a writing platform, among others, help.

One trend that is likely to become increasingly important in the future of AI-powered and Automation-driven IMC is voice search. As more people use voice-activated assistants like Amazon's Alexa and Google Home, businesses will need to optimize their content and ads for voice search queries. This will require a different approach to SEO, keyword targeting, and a focus on creating content that is easily understood and responded to via voice.

(See: Kerr, G., et al. 2023; Boinapalli, N. R., et al. 2023; Adeyinka, K. I.,

et al. 2024; Setiawan, B. 2024; Yoldaş, E. N., & Aycı, A. 2024; Morton, F., & Treviño-Benavides, T. 2025).

Fig.4. Benefits and Advantages of Using AI in Marketing and Sales



Source: Kaizen Institute Team. 2025

The most important benefits of Generative AI in Integrated Marketing Communications and promotional efforts are the ability of its tools and applications, such as Large Language Models (LLMs) and Virtual Assistants (VAs), to:

- Hyper-Customization, which is the creation of highly personalized content for customers, by analyzing customer data and characteristics and creating targeted, personalized marketing messages that resonate with specific demographics. This can lead to higher engagement and better conversion rates, as customers are more likely to respond positively to personalized messages.

- Achieving efficiency and effectiveness, by automating repetitive and routine tasks, saving time, money, and effort for more strategic marketing activities, such as establishing Chatbots that can answer customer questions, recommend products, and provide customer support, such as Frequently Asked Questions (FAQs). This will help create more profitable and effective marketing campaigns and achieve their marketing goals more quickly.

- Creation more engaging and compelling content that captures customers' attention. For example, ChatGPT can create personalized Chatbots that answer customer questions and provide support, while Synthesys can generate lifelike voiceovers for videos, potentially increasing brand awareness, generating additional sales, and growing market share.

- Improve Customer Relationship Management (CRM) by enabling

them to engage with personalized messages, increasing the likelihood of converting a prospect into an existing customer. Generative AI can help understand what motivates customers and create messages that resonate with them.

- Enhance time management and feedback by optimizing marketing campaigns in real time based on customer data analysis and making adjustments immediately. In addition to making optimal decisions, it enables businesses to make informed, data-driven decisions that improve the effectiveness of their campaigns.

(See: Ngoc, N. M., et al. 2025; Farahmand, E. 2024; Soni, V. 2023; Senyapar, H. N. D. 2024; Israfilzade, K., & Sadili, N. 2024; Martínez-Rolán, X., et al. 2023; Patil, D. 2024; Lakshika, V. G. P., et al. 2024).

Fig.5. Integrated Marketing with Generative AI



Source: Jaiswal, R. 2025

However, as with any technology applied to IMC, Generative AI faces a set of challenges that the marketing and sales executive and their management team must overcome to maximize its potential. Some of the biggest and most significant of these potential drawbacks and obstacles are:

- Ensuring customer data privacy. Cybersecurity, particularly relevant to the field of Integrated Marketing Communications ethics, is more essential today than ever before, given the increasing risks of customer information breaches. Marketing departments collect and store vast amounts of shopper data, such as their purchasing habits and bank accounts. There is a risk that this information could be misused or fall into the wrong hands. Therefore, it should be used in accordance with regulations and laws,

as data breaches can lead to legal concerns, serious reputational damage, and significant financial losses.

- Integrating Generative AI tools and technologies with IMC systems may be incompatible, resulting in a lack of coordination between the various systems. This can ultimately hinder the effectiveness of implementation and achievement of set objectives. The integration process can be complex and time-consuming, requiring significant investments in resources and expertise.

- Relying on Automation and smart robots to provide customer service may lead to the public feeling and sense that they are dealing with inanimate objects and machines rather than humans. Despite the scientific and technological progress in this digital age, the emotional aspects, human touch, and building personal relationships in Customer Experience (CX), complaint management, and objection handling cannot be replaced or occupied by automated cyber systems.

- Human expertise specialized in a comprehensive understanding of the outputs of complex AI & ML algorithms are not available internally to all organizations, particularly small and medium-sized enterprises. In reality, it is difficult to interpret the results in a meaningful and thoughtful manner. Consequently, the reliance remains on consulting firms, which in themselves are extremely costly.

- Meeting personalization requirements can be costly and time-consuming, requiring significant investments in resources and expertise. Companies need to carefully assess their needs and determine whether the benefits of personalization outweigh the costs.

- There is also the potential for bias in the data or algorithms used in AI & ML, which can lead to discriminatory outcomes.

Moreover, IMC is a highly complex process that requires a deep understanding and exploration of the audience, the brand, and the market. While Artificial Intelligence can certainly provide valuable insights that inform executive management decisions with scientific impartiality, free from any human bias, it cannot replace the expertise and experience of human marketers, who have spent decades honing their craft and sculpting their talent.

Although there are research efforts to uncover IMC supported by AI & ML, a final judgment is very difficult, and there is an urgent need to conduct

more in-depth studies on the application and development of AI & ML technologies and their integration into IMC processes.

Among the leading global companies that are considered a model for activating and stimulating integrated marketing and promotional communications content using Artificial Intelligence technology is the German industrial giant Siemens, which has partnered with a California-based American startup called Storyroom, which specializes in Artificial Intelligence for Natural Language Processing (NLP), which involves teaching machines to understand the nuances of human language through syntactic and semantic analysis of text, speech, and conversation to deduce the meaning of a sentence.

(See: Pinegar, G. 2023; Dawal, A. 2023; Brobbey, E.E., et al. 2023; Ben-Seth, G. 2023; Alkhayyat, A. M., & Ahmed, A. M. 2022; Seall, M. 2021; Büyüksomer, A. E., & Tekeoğlu, A. N. T. 2024; Chatterjee, P., & van Dun, D. H. 2025; Khan, T., et al. 2024; Alenezi, A. M., et al. 2024; Shi, B., & Wang, H. 2023; Chandra, S. 2024; Wu, Q. 2023).

Fig.6. Ethical Challenges in Generative AI



Source: AI TechPark Team. 2023

4. Conclusion:

Ultimately, Artificial Intelligence (AI), sometimes called Machine Intelligence, is intelligence demonstrated by machines, as opposed to the natural intelligence demonstrated by humans and animals, such as learning and problem-solving. In this context, AI technologies are evolving at a breakneck pace, primarily because Automation processes large amounts of data in real-time, making predictions more accurate and personalization higher-quality. Therefore, many global technology companies across various industries are racing to invest massive amounts of money in AI applications. Today, the most successful, superior, and distinguished

businesses are employing AI to improve their operations and exceptional performance, and to gain an advantage over their competitors and rivals. Generative AI is one of the most significant disruptive technologies that has revolutionized the world of digital innovation, offering many intelligent solutions, such as Large Language Models (LLMs) and Virtual Assistants (VAs).

In the midst of the ramifications of the fourth generation of the industrial revolution, the preludes to the fifth wave of the industrial revolution, and the resulting digital age (Metaverse), a world characterized by abundant information, fierce competition, and computer and cyber developments, marketing systems supported by Information Technology (IT), Wireless Communications (ICT), and Internet have become more vital and dynamic. They have provided strong momentum, impetus, and tremendous opportunities for organizations to meet the need for growth and expansion in national and global markets. With the continued progress of science and technology, the world of marketing is changing at an exponential rate, and the fate of traditional marketing in the physical environment is now at stake. This is because the technological boom in the age of intelligence has rendered old marketing methods and activities powerless, unable to withstand the passage of time, and are on the verge of atrophy and extinction.

The marketing process, at its core, is about effective communication and seamless access to the target audience, understanding their needs, desires, tastes, and expectations, and finding the best ways to deliver value in a way that resonates with them, builds brand awareness, and enables increased engagement and advocacy. An Integrated Marketing Communications system is the cornerstone and critical element for the success of this process, which has an economic end result: increasing sales, improving return on investment, improving profits, and building long-term relationships with consumer segments. Integrated Marketing Communications include formulating messages and delivering them across various channels and programs.

With the advent of AI and Automation, marketing management quickly embraced its rich and effective applications in a remarkable and significant way. Integrated Marketing Communications were among the most significant promotional sources that benefited from this amazing

scientific and technical development. With the emergence of AI and Automation, marketing communication has become more agile and flexible than ever before. Integrated Marketing Communications tools supported by AI and Automation provide numerous opportunities and gains for companies, through the creation of targeted and customized content that resonates with the audience. The importance of adopting Generative AI technologies is increasing in improving and enhancing the outputs and outcomes of promotional activity in the long term, especially with regard to analyzing massive amounts of data and providing actionable strategic insights.

Since the Automation of Integrated Marketing Communications and the Hyper-Personalization of coherent promotional messages automatically rise to the level of expectations of the target audiences, this represents one of the biggest challenges facing every company, which has a strong bond and a strategic connection in how to acquire new customers and nurture the existing customer base according to the (win-win) binary. The recommendation we extract from this research paper is the inevitability of adopting and embracing digital technologies, cyber tools, Artificial Intelligence algorithms, and Machine Learning (ML) solutions in the marketing industry in general, and the promotional industry in particular, today before it is too late. They are strong pillars and effective foundations that allow for achieving a Sustainable Competitive Advantage (SCA) and enhancing continuous success in a purely efficient and effective manner.

In conclusion, this theoretical research shows that companies and institutions, as part of the international economic and commercial system, are in dire need of digital transformation in the marketing industry in general and marketing communications in particular, by incorporating Automation tools and harnessing Generative Artificial Intelligence algorithms in marketing and promotional decision-making and making optimal use of them. Cyber and technical competition is fierce and intense, and survival is for the fittest and best in science, research, computing, and electronics, due to the changing rules of the competitive game. It is difficult to ignore these profound technological changes, but they should be taken seriously.

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