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The Use of Technology Assisted by Artificial Intelligence Depending on the Companies' Digital Maturity Level

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Abstract: Major companies in the global market have made significant investments in artificial intelligence-assisted technology to increase the value of their products and services, which gives the implementation of artificial intelligence an extremely important role. Starting from these premises, the authors set out to evaluate the transformation level of companies in terms of adopting technology based on artificial intelligence according to their level of digital maturity. For this purpose, qualitative research was used by deploying the inductive method, which allowed five distinct categories of companies with unique characteristics to be identified, generating an interval scale that illustrates the level of digital maturity and the ability to adopt and implement viable solutions based on artificial intelligence technology. This paper, in addition to identifying the digital transformation level of companies, offers solutions and recommendations for addressing the challenges encountered by the business environment, thus contributing to the understanding and development of strategies adapted to each situation that may appear on the market.

Keywords: artificial intelligence; digital maturity; companies; digital marketing agencies; business strategies



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1. Introduction

Major players in the global market have invested in artificial intelligence (AI)-assisted technology to improve their products and services. Notable examples include companies such as Google, IBM, Amazon, Tesla, Meta or Microsoft, Netflix, and Airbnb, which have implemented AI-based solutions within the actions related to the optimization of internal processes and up to the commercial strategies applied to offer innovative products and services on the market. Considering the tone set by large companies operating globally, the authors raised the issue of implementing solutions aligned to the 5.0 society to other companies of different sizes, medium or small, to which the trends and exigent requirements of consumers dominated by the typology of digital informers bring, for the most part, only challenges that are difficult to manage.

In this context, the authors intended to find out how ready companies are to adopt technology assisted by artificial intelligence. This aspect led to the formulation of the research question around which the entire paper was built. Starting from the premise that the importance of small- or medium-sized companies (SMEs) is crucial [1] for the digital development of society [2], this research aimed at identifying which companies are ready to use AI, as well as which companies are being pressured to adopt AI. The authors intended to build a theoretical framework aimed at evaluating companies readiness to integrate AI-assisted technology, with a particular focus on marketing agencies, based on their digital maturity level. Their objective was to address existing concepts and models to develop a tool for measuring readiness in this context. To achieve this goal, the

authors employed a qualitative research approach, specifically utilizing inductive research methods, to capitalize on existing models and relevant observations to their research topic. Consequently, an explanatory model was formulated, delineating five distinct categories of companies characterized by varying levels of digital maturity.

This research makes a significant scientific contribution to the specialized literature by not only advancing the theoretical understanding of the topic but also by providing practical solutions to the challenges that companies encounter in implementing artificial intelligence solutions based on digital maturity level. The objectives stated to this end were to (O1) classify companies in terms of digital maturity level, (O2) identify activities that can become more profitable through artificial intelligence, and (O3) highlight the challenges, limits, and opportunities for companies regarding the implementation of solutions based on artificial intelligence.

Carrying out the research allowed five typologies of companies to be determined, each of them being described in detail according to the explanation of the challenges and limits they present in relation to the adoption of technology based on artificial intelligence. In essence, the authors' work fills a crucial gap by providing a holistic perspective on the interplay between digital maturity and AI adoption readiness, thereby empowering organizations to make informed decisions and devise strategic plans to deploy technology for competitive advantage.

Considering the premises presented, the authors organized this paper into four main sections: a review of the existing literature, an explanation of the research methodology, an analysis of the obtained results along with supplementary discussions, and a final section comprising conclusions and suggestions for future research directions.

Literature Review

Artificial intelligence (AI) has attracted increasing interest recently, being considered by specialists and representatives of the business environment as a technology that will have an unprecedented impact on human development [3]. AI should not be seen as a single technology, as it represents a combination of technologies used in several industries which can improve the performance of companies in these fields [4]. The use of AI can lead to optimization of the structure of management processes [5] and to improvement of "the operational and business processes of organizations" [6].

AI can be a tool for building sustainable business models and innovative processes, leading to important economic, social, ethical, and legislative changes [7]. The implementation of AI imposes the need to analyze the specifics of each organization and the stage at which this implementation process is situated [8], creating favorable conditions for cultivating implementation, information, and understanding by managers and staff and studying both positive and negative aspects [9].

While concerns about bringing AI into business are not new, there is still a gap regarding the understanding of how AI can drive business value [10], of the concrete way success factors can have an impact on the adoption of AI [11], and the implications for environmental sustainability [12]. There are also negative aspects of artificial intelligence, such as the lack of control, the poor quality of data, and the insufficient training of personnel, that can generate inefficiency in the activity of companies and are studied too little by specialists [13]. Studies show the importance of employees' knowledge and understanding of AI processes, the need to create "sociotechnical capital", and the implementation of "AI socialization" to successfully integrate AI systems with employees [14,15]. Previous research has highlighted a number of issues that need to be resolved regarding the integration of AI, namely the modification and rethinking of the organizational structure, the skills required of employees and the education of the future workforce, ethical and legislative issues regarding data protection and defining the role of robots in society, and how these innovative tools can lead to predictions for future development [16]. The effective integration of these technologies indicates the digital maturity status of both a company and, at a broader scale, a country [17]. Specialists consider digital maturity as a pivotal factor

bridging the digital orientation of companies and their financial prosperity [18]. Also, the main goal of the digital transformation of companies is to rethink the business model to improve productivity and reduce costs [19].

The massive role artificial intelligence is playing in reshaping society cannot be denied. Beyond the undeniable opportunities it brings to development and progress, from economic and social points of view, AI is to a significant extent fraught with risks, at least in terms of privacy, transparency, and discrimination. Ethics in AI refers to a framework of moral values and methodologies designed to steer the ethical deployment of artificial intelligence, with the aim of safeguarding human welfare [20].

The first ethics guide in the field of AI was the Principles of Artificial Intelligence signed by governments in 2019—OECD [21]. In parallel, a code of ethical instructions in the field of AI was developed by the European Parliament [22], which underscores concerns regarding the ethical, legal, and economic dimensions linked with AI, impacting essential human rights and liberties. These concerns encompass the effects of AI and robotics technologies on employment, such as job displacement due to automation. There are also demands for evaluating the influence of algorithms and automated decision-making systems on safety and trust levels. Furthermore, considerations extend to digital currencies and transaction systems facilitated by networked computers, such as blockchain technology and the propagation of disinformation (fake news), as well as the potential military applications of algorithms (autonomous weapon systems and cyber security). Continuing these trends, UNESCO generated the first global standard in AI ethics “Recommendation on the Ethics of AI”, recognizing that AI systems have the potential to bring privileges, to constitute a threat to human rights, to contribute to the degradation of the environment, etc. [23].

The most pressing ethical issues when considering AI in organizations’ interaction with the human factor can be extracted from the literature. AI systems can perpetuate, by taking in a massive amount of data, the biased approach that is embedded in previously practiced social norms. If the algorithms are not unbiased or unrepresentative for all categories, the results generated by them may exclude minority categories [24]. Discrimination brought by algorithms can also be the result of wrong or biased input data or caused by the mathematical architecture of the algorithm [25]. Moreover, AI can limit autonomy to the extent that it provides predefined choices, and there is a risk of replacing interpersonal relationships when communication tends to take place exclusively through AI-generated assistants [26]. In some studies, transparency and responsibility are issues that appear as a priority in AI-related ethics, being assimilated to the concept of trustworthiness [27]. Relevant information provided to participants can help them make an assumed and agreed decision [28].

If, in the case of an artist making a work, they can assign copyright, when a digital work is generated with the help of AI, by an individual or an organization, given that the AI systems were generated by others, it is questioned which of the two parties is more entitled to being attributed the result [29]. Moreover, AI algorithms have the capability to produce misinformation, manipulate public sentiment, and exacerbate social divisions. AI systems multiply the ability to use personal data that can harm individual interests, through the ability to process data at an impressive level of power and speed [30]. AI systems may collect data that are not necessarily required, or even prohibited by the privacy policy, without users being notified. The extensive collection of data and their transfer can impact the confidentiality and privacy of individuals [31]. Simply obtaining consent does not solve the problem of ethics in AI [32]. As AI systems evolve, automation has the potential to replace human labor, creating unemployment and exacerbating social inequalities. Even with the development of new branches based on AI, the emergence of new jobs requires professional conversion measures and economic support for the transition of the workforce involved.

Organizations willing to implement AI systems face several difficulties, conceptual as well as practical. The challenges of using AI are divided, according to the study by

Mökander [33], into ethical, legal, and technical challenges. Another recent study [34] was able to categorize the barriers to AI adoption into three major areas: technological, organizational, and cultural. The same study demonstrated that the majority of the decision makers interviewed (91%) faced challenges in all three areas, citing the following major barriers: laws and regulations (which hinder innovation and learning because compliance is costly and restrictive); lack of employee experience in AI implementation; lack of understanding of AI, both in the organizational environment and among customers; resistance to change.

A challenge with their significant major impact on organizations is the very high costs of deploying and sustaining AI solutions [35]. Additional barriers identified in this paper include a lack of comprehension and confidence in AI, as also referenced in the literature [34]. Challenges highlighted encompass data quality and connectivity, involving the integration of data from diverse sources like suppliers, customers, and internal systems. Furthermore, there is the task of integrating AI into existing processes and workflows. Issues related to data quality and management, including concerns over data privacy and security, pose additional challenges. Moreover, inadequacies in IT infrastructure, reliance on external AI providers, and cultural and organizational barriers compound the issues faced. In order to be aware of the challenges in implementing AI and to propose strategies for managing and mitigating the risks associated with adopting AI in business, organizations need to develop deep business-wide analyses. These analyses start from evaluating the vision of the organization, the staff, the transformation of the processes and technologies used, and the availability of data [36]. At the same time, the major implications of managerial decisions [37] and different risk management assessment methodologies, as well as cyber security concerns, must be mentioned.

The data privacy barrier starts from the fundamental notion that having more data allows AI systems to become better. The strategic solution provided by [38] is the implementation of a data-sharing policy in the company, a method by which the need for data duplication is reduced. Related to the establishment of the AI team, a possible strategic managerial option (other than hiring dedicated staff) is to improve the skills of existing employees (by participating in dedicated development programs, training, experts who can make practical presentations within companies, etc.).

The study of Hopf [39] proposes a model that identifies challenges, tensions, and tactics in implementing AI in organizations. Among the tactics developed in the model, the following are mentioned: establishing verification tools on what AI can and cannot do, calling on external experts to start AI projects, training managers and establishing appropriate indicators, and creating bridges between AI and IT. From the specialized literature point of view, the optimal option regarding the personnel involved in the adoption of AI by companies has not yet been identified, each company having to carry out its own analysis and apply the personnel strategy considered appropriate.

2. Materials and Methods

In the initial phase of the methodology, the authors aimed to build a theoretical framework focused on evaluating companies' readiness to integrate AI-assisted technology, particularly within marketing agencies, based on their digital maturity level potential. This concept can be described as highlighting a particular level of social and economic consciousness that empowers businesses to adeptly deploy digital technologies in pursuit of their objectives [40]. In recent times, experts have concentrated on devising models to evaluate the digital maturity of small- and medium-sized enterprises (SMEs), outlining the stages they need to trace to realize their digital transformation aspirations [41]. At the same time, there is the issue of proactively developing employees' skills and their mentality so that they can control digitization and see it as an opportunity [42]. A company is fully digitally mature when it uses technology in all activities and operations that take place within it, being, however, different from the level of digitization (since the latter refers to digital technology usage within systems, processes, and activities related to the company's services and products). This aim drove the authors to address existing concepts and

models, employing a qualitative research approach, specifically utilizing inductive research methods [43] based on existing models and observations identified as highly useful for the research topic, capitalizing on existing models and observations relevant to the research topic. Through this approach, the authors aimed to classify companies according to their digital maturity level, identify key activities for enhancement through artificial intelligence, and elucidate the challenges, limits, and opportunities surrounding the implementation of AI solutions. Subsequently, this research led to the determination of five typologies of companies, each meticulously described in terms of the challenges and limits they face in adopting AI-based technology. Each category was placed into a scale to be easier for practitioners and theorists to evaluate. Thus, the study contributes significantly to bridging the gap between digital maturity and AI adoption readiness, equipping organizations with the insights needed to make informed decisions and strategic plans for leveraging technology to gain a competitive edge.

The motivation behind this choice was the possibility to formulate some specific observations that turned into general ideas, making it possible for the authors to use a “bottom-up” method [44] and to develop a theoretical, explanatory model on the topic of the utilization of AI-assisted technology according to the digital maturity level of companies.

According to the evaluation tool originally developed for assessing non-profit organizations, and later developed for other organizations, the authors were able to develop an explanatory model that draws the boundaries of the levels and promotes, in the foreground, the status of five typologies created in accordance with the potential of using AI-assisted technology.

To reach the intended objective, the authors have structured this section into three parts. The first of them presents the methodology of digital maturity assessment and the creation of typologies that this model claims. The second part refers to the understanding of the classification of tasks performed by AI, mentioning and explaining three types of tasks, and the last one presents the motivation for choosing the case study of marketing agencies.

2.1. Digital Maturity Assessment Methodology and the Outlining of Typologies

To be able to build a measuring scale to analyze the level of digital maturity and AI-assisted technology integration for digital marketing agencies, the researchers utilized a standard questionnaire, developed by [45], which comprises 17 cross-referenced skills categorized into five stages of digital maturity. This questionnaire allowed researchers to assess digital marketing agencies’ potential across various dimensions, providing insights into their digital maturity levels.

The questionnaire was structured around four key areas: attitudes and foundations, people, skills, and processes, systems and information, and outcomes and experiences. Through the respondents’ answers, authors considered a percentage representing the level of digital maturity for each evaluated company, ranging from 0% to 100%. Based on the responses from the 2077 participants to the digital maturity study, the distribution of digital maturity assessment results across different areas was determined, as illustrated in Figure 1.

This analysis provided a comprehensive understanding of the digital maturity landscape, which was used for the marketing agencies case study because of its validity. Furthermore, research was elaborated into the classification of tasks performed by AI, categorizing them into banal tasks, formal tasks, and expert tasks. By elucidating the characteristics and examples of each task category, the authors aimed to facilitate a deeper comprehension of how AI can be applied across various processes and activities within this type of organization. Finally, they conducted a case study focused on digital marketing agencies to exemplify the practical implications of research findings. Through a rigorous analysis of specialized literature and identification of activities that can be made more efficient through AI implementation, the potential impact of AI on digital marketing processes is highlighted and presented in the next section.

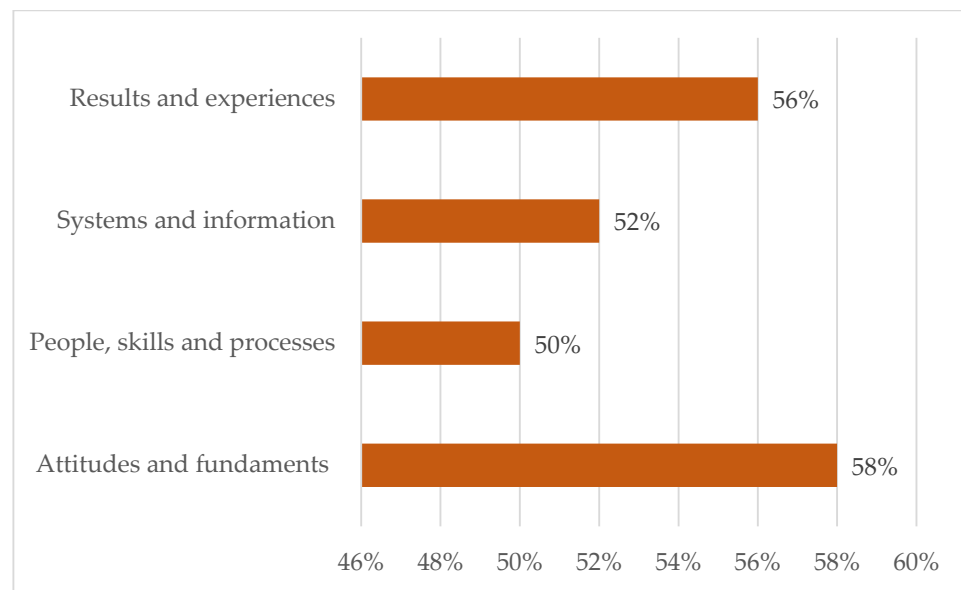


Figure 1. Distribution of digital maturity assessment results by area for 2077 companies: 0–29% (level 1); 30–49% (level 2); 50–69% (level 3); 70–89% (level 4); 90–100% (level 5). Source: (Digital Maturity, 2023).

2.2. Understanding the Classification of Tasks Performed by AI

Tasks performed through AI are divided into the following categories: banal tasks, formal tasks, and expert tasks [46–48]. For each type of classification there are examples of ways in which AI can be applied to facilitate various processes or activities. For example, in the category of banal tasks, AI can be implemented for operations related to computer vision or speech (related to perception), natural language processing (language generation or translation and understanding), or robotics (through interventions on locomotion). On the other hand, formal tasks are related to disciplines such as logic, mathematics or geometry, verification, and often proving a theory. Finally, expert tasks belong to scientific analysis, financial analysis, creativity, or even medical diagnosis. For humans, thanks to perception, speech, the use of language, and locomotion, banal tasks are the easiest to learn, followed by formal ones, the most difficult being those of expertise. In the case of technology, the advancement and implementation of certain very complex algorithms have meant that expert tasks can be handled easily. A relevant example is the use of AI in performing scientific analysis through the Cognos online application, created by IBM. Nowadays, it has become easy to generate graphs, tables, or conclusions about the questions that a researcher raises based on a file containing the raw data required for a complicated analysis, where it is even necessary to highlight some unexpected results.

Aspects were highlighted for an easy understanding of the category of tasks that AI performs to review that category needed in the development of the explanatory model, through which it was possible to answer how ready companies are to use AI-assisted technology.

2.3. Case Study of Digital Marketing Agencies

In focusing on marketing agencies, the authors recognize a crucial aspect of contemporary business operations [49]. Marketing agencies play a pivotal role when it comes to shaping brand perception, driving consumer engagement, and influencing purchasing decisions in the current digital landscape. [50,51]. As such, understanding the readiness of marketing agencies to embrace AI-assisted technology is paramount for several reasons.

Firstly, marketing agencies operate at the forefront of technological innovation [52], constantly seeking ways to optimize their strategies and deliver good results for their clients. The integration of AI into their operations has the potential to revolutionize marketing practices, enabling agencies to analyze vast amounts of data, personalize customer experiences, and streamline campaign management processes [53].

Secondly, marketing agencies serve a diverse range of clients across various industries, each with unique needs and challenges. Assessing the readiness of marketing agencies to adopt AI technology provides valuable insights into the broader trends and opportunities within the marketing industry. It offers a glimpse into the evolving landscape of marketing practices and the emerging technologies shaping the future of the industry. By uncovering the challenges, limitations, and opportunities associated with AI adoption in marketing agencies, this study offers good practices and actionable insights for marketers, business leaders, and industry stakeholders alike. It prompts discussions on the strategic implications of AI integration, the ethical considerations surrounding data-driven marketing approaches, and the skills and capabilities required to thrive in an AI-powered marketing ecosystem. By focusing on marketing agencies, the authors addressed a critical sector at the intersection of technology and business, offering valuable insights into the readiness of organizations to embrace AI and paving the way for future advancements in marketing practices.

Furthermore, as AI continues to reshape marketing practices, it becomes increasingly crucial for organizations and their decision makers to cultivate a culture of innovation and adaptability, equipping both employees and leadership with the skills and knowledge needed to harness the full potential of AI technologies in their day-to-day work. The specialized literature presents the theory of replacing manual tasks with AI tasks, emphasizing its impact on digital marketing. Experts from various industries say that the impact of using AI in marketing processes will be strongly felt in the coming years, with company administrators and decision makers having to prepare both organizations and employees to implement AI-based solutions in their day-to-day work [54]. Following a rigorous analysis of the specialized literature, eight activities were identified that digital marketing agencies can make more efficient by implementing AI.

3. Results and Discussions

The findings of this research emerged after assessing digital maturity and delineating typologies. Through the utilization of an analytical tool to gauge the digital maturity level of companies, five typologies were discerned (refer to Figure 2), each delineating distinct attributes across 17 dimensions: culture, leadership, collaboration, budget, innovation, capacity, recruitment, learning, project management, technology, data, reporting, insights, communication, optimizations, service delivery, and internal systems.

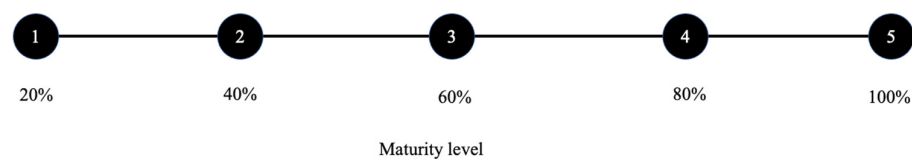


Figure 2. Interval scale of the digital maturity level of companies. Source: figure made by the authors.

The interval scale depicted in Figure 2 was established through a rigorous process of analyzing the convergence of response patterns determined from the survey's variants of responses. Rather than relying on explicit questions, the scale was derived from the intersection of various response variants provided by respondents, reflecting their inherent maturity levels within the assessed dimensions. By synthesizing these response patterns, the scale offers a detailed description for each individual level, providing insights into the nuanced progression of digital maturity within the studied context.

For *Level 1*, the culture dimension describes this level as marked by staff who keep away from the digital domain and try to avoid it. At the management level, there is no orientation towards the digital approach, the company's budget covering only those basic aspects necessary for the activity, such as, for example, financing the hosting of the domain for the company's website. In companies at this level, innovation is not considered important or does not happen at all. In terms of work capacity, one person handles the

website and email. Also interesting is the fact that this person may not have a digital background or have a special skill set aligned to the field. Staff recruitment is carried out with an emphasis on technical skills only for the position aimed at website maintenance. In terms of the learning dimension, digital experts teach other employees on an ad hoc basis, and the budget allocated to training is very small. Another important aspect is that project management is performed differently for different projects. The existing systems within the company are limited and not integrated, not being secure. Data within the organization are scattered and mostly represent the company's offline activity. Performance indicators exist, but progress is measured ad hoc. Insights are collected but used inconsistently. The digital medium is used as a channel for communicating non-digital activity. Information is shared online, and traditional offline services are displayed on the website, with no will or budget to digitize systems or processes.

Level 2 of digital maturity is characterized by an organizational culture where employees are satisfied that specialists handle digital aspects. However, management sees the role of digital technology primarily as a tactical one, and the allocated budget supports the current setup without allowing for significant improvements. In terms of innovation, it occurs occasionally within existing projects, and basic digital skills are covered by experienced specialists. Recruitment includes specialized digital skills in specific roles that support engagement. There is a small budget for developing core digital skills in digital expert roles, and common principles are used in project management. Technological systems are not keeping pace with the needs of the organization, and data are considered important, improving their quality and use in various fields. Relevant KPIs are set and reported, but the lessons from these reports are not always put into practice. Insights from multiple sources are combined to build understanding, and digital advice is sought when deemed necessary. There is also some experimentation with service delivery using digital channels, but the availability and use of internal digital tools are irregular.

Level 3 of digital maturity is characterized by a deep understanding of digital value within the organization and its desire to learn more in this area. Management encourages the digital leader to take a strategic approach when time permits. The allocated budget allows for the testing of new ideas in priority areas, and there is an innovative reimagining of some aspects of the products or services. There is a core team of digital specialists, and extensive digital skills are required across all areas of the organization. Organizational training normalizes digital skills and projects heavily due to the structure and it being a very long process. The systems are stable and allow basic operations. There is a clear policy for data management, this being integrated and analyzed. Performance data are collected and linked, but access to them is difficult. Knowledge about people's identity is combined with behavioral insights. Digital technology is involved from the beginning in communication planning, and digital services are considered as important as traditional offline services. Good digital tools are available, and their support and integration are provided upon request.

Level 4 of digital maturity represents the stage at which digital technology is perceived to be key to success and are integrated into all aspects of the organization. There is a senior digital leader, and management is actively investing in digital technology. The budget is increasingly supporting digital ways of thinking and acting. There exists one or more teams, and digital opportunities are growing. Strategic digital skills are standard and included in job descriptions. Increasing digital skills represent a top priority for employees, with teams understanding their impact on digital changes. Project management principles and practices are used, with a launching, testing, and continuous improvement approach in place. Tools and systems bring improvements in efficiency. Quality and integrated data are used throughout the organization. Insights play a pivotal role in shaping both planning and delivery strategies. Communication strategies are predominantly designed with a digital-first approach. Providing online services is based on research and rigorous testing. Organizations prioritize investments in digital tools aimed at enhancing the overall work experience of their staff.

Level 5 of digital maturity highlights that digital technology is the primary way to reach the organization's mission. It is fundamentally integrated into the overall strategy, and digital leadership is present at all levels. A healthy budget for the continuous evolution of digital operations increases the impact of the organization. A structured innovation program creates transformative change. A very experimental digital leadership type exists across the organization, with effective teams. New hires present digital skills, and all job descriptions express a need for them. The learning function drives the development of digital skills and behaviors at all levels of the organization. Principles of digital project management are used consistently across all projects to improve efficiency and impact. Interconnected tools and systems provide a smooth and efficient experience for internal and external users. Real-time data are used across the organization to shape decisions and performance. Holistic performance data are always available and used strategically. All work is based on rich and constantly updated insights, being iteratively improved. The digital environment is used to create adaptive and integrated communications. Online services are iterative and integrated, generating impact and coverage never seen before. A large range of connected digital tools is used, with proactive staff support.

The characteristics of each level of digital maturity of the companies led not only to the description of the 17 dimensions according to each level but also to the outlining of related typologies (Figure 3).

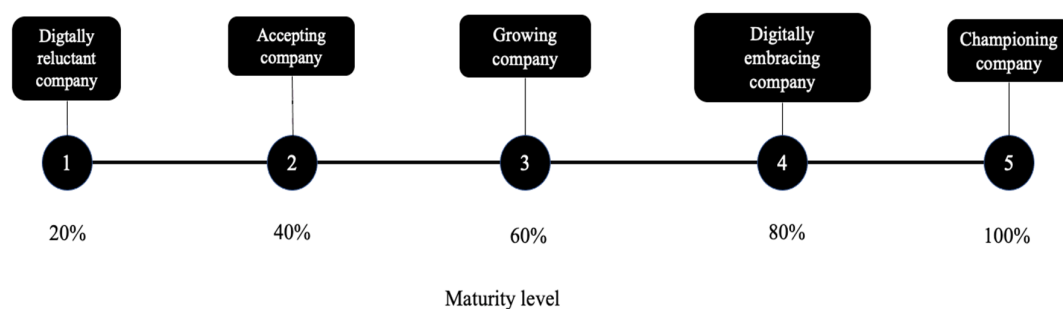


Figure 3. Interval scale of company typologies according to the level of digital maturity. Source: figure made by the authors.

The *reluctant company* typology shows that the organization is not convinced that digital technology can contribute to achieving its mission and goals. As a result, the digital environment is underrepresented and underfunded. Not only is the organization missing out on opportunities, but there is a risk that it will not keep up with trend alignment. Reluctant company workers prefer to do things the way they have always been done rather than experiment with new technologies, systems, and processes. A reluctance to evolve in line with the external environment makes the organization increasingly self-focused. In the case of this typology, it is necessary to change attitudes to establish bases in the digital field.

The *accepting company* typology shows that the organization's attitude towards the digital environment can be characterized as "accepting". In other words, the company has a good understanding of digital potential and allocates some resources to the basics. However, technology, systems, processes, and digital skills are disparate, and obtaining a budget for new digital projects is a difficult battle. The organization is open to considering innovative uses but has difficulty with adopting new and different ways of working.

The *growing company* typology and the *technology-embracing company* typology are actively using the digital environment to be more efficient and effective. It is not yet integrated in all aspects, but there is an organizational understanding that the digital environment is crucial to operations, culture, and the experience that customers have when interacting with the organization. Digital staff are supported and encouraged. Resources do not always match ambitions, meaning that people, systems, and digital processes are occasionally under pressure. In the case of this typology, simplification and improvement will increase efficiency, effectiveness, and well-being.

In the case of the *champion company* typology, digital maturity can be characterized as “promoting” or “championing”. Individuals employed within the company perceive the digital environment as the primary means to actively engage with current and potential supporters. Digitalization serves as a central component for operational and engagement activities, encompassing a diverse array of functions including strategic leadership and communications planning, brand experience, user engagement, supporter services, program or service delivery, and technology development and maintenance, as well as innovation endeavors.

All these characteristics related to the activities that digital marketing agencies can make more efficient by implementing AI led to the highlighting of the challenges, limits, and opportunities presented in Table 1.

Table 1. Activities of advertising agencies made more efficient through AI according to the typology of the company regarding the level of digital maturity.

Activity	Description	Opportunities Depending on the Level of Digital Maturity *
1. Target audience segmentation and identification	By applying AI algorithms for advanced data analysis and identifying behavioral patterns, they allow marketing specialists to refocus their efforts on more relevant audience segments and deliver personalized content. Precise segmentation of the target audience using AI-based solutions can be achieved with the help of specific clustering and/or classification techniques. Also, through this technology, applied machine learning models can be used to identify consumer patterns and behaviors but also to use the information obtained in personalized marketing campaigns [55–57].	For level 1. Using basic tools for simple audience identification and segmentation.
2. Personalized recommendations	In the scope of this aspect, the operation of AI recommendation systems, in the form of collaborative filtering algorithms or neural networks, and how they are used to anticipate user preferences, but also to evaluate and optimize the performance of recommendation systems, were identified [58,59].	For level 1. Providing simple, generic recommendations based on basic data.
3. Automation of advertising campaigns	Analysis of different techniques and optimization of the process of making pay-per-click campaigns by allocating the budget in real time to maximize the effectiveness of digital marketing campaigns. Machine learning algorithms adapt to changes in user behavior and the data-driven online environment [60].	For level 1. Implementing simple automations in advertising campaigns.
4. Content creation	On this topic, the use of AI refers to the application of language generation models, such as recurrent neural networks (RNNs) or generative adversarial networks (GANs) and how they are used to produce relevant and engaging content. Also, for content creation, AI can be applied in operations related to the analysis of the quality and originality of the content generated in the context of the needs and preferences of the target audience [61].	For level 2. Using AI to generate simple and personalized content.

Table 1. Cont.

Activity	Description	Opportunities Depending on the Level of Digital Maturity *
5. Sentiment analysis and receiving feedback	Interpreting and analyzing user feedback and feelings about brands or products through AI technologies such as natural language processing (NLP) and sentiment classification algorithms. Around this topic, there are also discussions regarding ethics and the correct interpretation of collected sentiments and how this information can influence marketing strategies [62,63].	For level 2. Using AI to analyze feedback and sentiment from customer interactions
6. Search engine optimization	AI algorithms are used for search engine optimization purposes by identifying search trends and optimizing content for increased search engine visibility. Through specific techniques such as semantic analysis or machine learning, specialists can more efficiently create more relevant content [64].	For level 3. Implementing advanced search engine optimization strategies with the help of AI.
7. Customer support and assistance	With the help of the technologies that are the basis of the functionality of chatbots, namely natural language processing and dialog models, it is possible to provide automated assistance and personalized interaction with customers [65–67].	For level 3. Using AI to provide customer support and assistance through a more complex system.
8. Advanced forecasting and analyses	Through machine learning algorithms and predictive models used for marketing purposes, user behavior can be anticipated, and through advanced data analysis techniques it is possible to provide essential information for making strategic marketing decisions [68].	For level 4. Use of AI for predictive analyses and advanced analyses in various areas of business interest.

* **For level 5:** The mentioned activities are integrated into almost all operational and strategic aspects of the organization, including all the mentioned activities at lower levels, but using a varied and complex range of AI techniques to achieve advanced and integrated results. In other words, each level encompasses not only the specific tasks outlined for that level but also includes the activities listed at lower levels. This integration ensures a progressive and comprehensive approach to digital maturity, wherein the capabilities and techniques introduced at lower levels serve as foundational elements for the advanced and integrated results achieved at higher levels.

4. Discussions and Conclusions

The authors' study addresses a critical gap in the existing literature by offering a comprehensive understanding of the relationship between companies' digital maturity levels and their readiness to integrate technology assisted by artificial intelligence. While previous research has recognized the importance of digital maturity and AI adoption separately, there remains a lack of cohesive insight into how these factors intersect and mutually influence each other within organizational contexts. To bridge this gap, the authors developed a theoretical model that illuminates the preparedness level of companies in adopting AI-assisted technology based on their digital maturity. Drawing on insights from established models, empirical observations, and specialized literature, the authors synthesized a framework that harmonizes digital maturity assessments with AI adoption strategies. Notably, they established a nuanced interval scale, shaped by the convergence of answer variants within their questionnaire, to offer a detailed depiction of each digital maturity level.

Through this approach, the authors presented a comprehensive framework that not only evaluates companies' digital maturity but also guides strategic decision making concerning AI implementation. By effectively addressing this gap, their study contributes to both theoretical advancement and practical implications for organizations navigating the complexities of digital transformation in the AI era, whereas the scientific novelty of the work results from the evaluation tool of companies from the point of view of the level of digital maturity in relation to the use of technology assisted by artificial intelligence, outlining five typologies that describe the stages of digital adaptation of organizations, es-

pecially digital marketing agencies. This study's focus on marketing agencies is significant not only due to their pivotal role in the digital landscape but also because they serve as early adopters and trendsetters in the application of innovative technologies, such as AI. As pioneers in digital marketing, these types of agencies are at the forefront of deploying AI to enhance their operations and deliver superior results for clients. By examining the readiness of marketing agencies to embrace AI, the authors provided valuable insights that extend beyond individual firms to the broader marketing industry. Their research contributes to a deeper understanding of the challenges and opportunities associated with AI adoption in marketing, paving the way for the development of strategies and best practices that can drive transformative change across the sector.

The authors' research significantly advances the discussion on digital maturity levels and their implications for organizational readiness to adopt AI-assisted technology, especially for marketing agencies. While existing studies provide valuable insights into digital maturity assessment and its applications across diverse sectors [69–71], this study stands out for its focused investigation into creating an interval scale methodology and scrutinizing 17 dimensions across five distinct levels of digital maturity, offering a nuanced understanding of organizations' readiness to embrace AI technology. Whereas previously mentioned research may have offered broad assessments of digital maturity or concentrated solely on technological aspects, this paper focuses on organizational dynamics influencing digital readiness. By identifying typologies, the authors provided actionable insights into the unique characteristics and challenges associated with each level of digital maturity, thereby enabling targeted strategies for AI adoption and digital transformation initiatives. Furthermore, our research not only advances theoretical understanding but also provides practical guidance for organizations seeking to enhance their digital capabilities. By furnishing a comprehensive framework for assessing digital maturity and informing strategic decision making, our study addresses a crucial gap in the literature, empowering organizations to leverage AI-assisted technology effectively for competitive advantage and sustainable growth.

This study's managerial implications underscore the imperative for organizational leaders, particularly those in digital marketing agencies, to proactively instigate strategic shifts toward valuing the benefits of technology assisted by artificial intelligence. Leaders must adapt their approaches and refine their leadership models to cultivate a favorable environment for innovation and adaptation to new technological demands. Crucially, developing and implementing a robust HR strategy assumes paramount importance in this digital transformation journey. Cultivating an organizational culture that encourages continuous learning and adaptability is crucial in this digital transformation process. Moreover, integrating AI into management practices requires solid and transparent ethical approaches, as well as effective risk management to ensure appropriate and sustainable adoption of the technology within organizations. This study highlights the pivotal role of organizational leadership in driving the successful adoption of AI-assisted technology. By embracing proactive strategic changes and encouraging a culture of innovation and adaptability, leaders can position their organizations for successful digital transformation.

In terms of theoretical implications, this study presents the evolving landscape of artificial intelligence-assisted technology, offering valuable insights for researchers and theorists. By deepening existing models, a new theoretical paradigm was discussed to understand the foundation and deep implications of the application of AI in digital marketing areas. Additionally, the interval scale generated from this research holds relevance across diverse disciplines such as philosophy, psychology, cognitive science, computer science, and mathematics, all of which contribute to the development of fundamental theories underpinning AI. From mathematical models and learning algorithms to theories of consciousness and ethics, theoretical research seeks to explore and answer the fundamental and conceptual challenges involved in the development and use of AI, providing solid foundations for future progress and its implications in various fields of activity.

Qualitative research and inductive analysis are methods that have produced valuable results, but they also present certain limitations and challenges. One of the main limitations of qualitative research is the subjectivity involved in the process of data collection and interpretation. Being based on observation and interpretation, qualitative research can be influenced by the subjectivity of researchers. This may lead to different conclusions or varying interpretations of the same data, which may affect the validity and reliability of the results. Another limitation of qualitative research is the impossibility of generalizing the results. Because qualitative research focuses on in-depth study, it is difficult to extend results to the entire study population. These limitations do not invalidate the value of qualitative research or inductive analysis but emphasize the importance of awareness and management of these aspects to ensure the validity and relevance of the results obtained.

Following the results and findings obtained from the assessment of digital maturity and the outlining of typologies within companies, it is possible to identify some directions for future research, namely understanding how organizational culture influences the adoption and use of digital technology. Future research can explore how organizational cultures can be shaped to encourage greater responsiveness and adaptability to change regarding technological innovations. Further research could aim to clearly evaluate the effectiveness and impact of digital technology adoption in different business areas. This could include identifying and measuring specific performance indicators that are relevant to different levels of digital maturity, as well as assessing long-term benefits. Another direction could be to develop and test different strategies and approaches to increase the level of digital maturity in companies. Research could explore specific tools, methods, or programs to support organizations in their transition to higher levels of digital maturity, adapting to the specifics of each company.

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