

# Integration and Innovation Path Analysis of Enterprise Marketing Data Management Based on Deep Learning

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## Abstract

**INTRODUCTION:** To explore the integration and innovation path of enterprise marketing data management based on deep learning to adapt to today's competitive business environment. With the continuous development of information technology, enterprises are faced with a large amount of marketing data, and how to efficiently manage and integrate these data has become an essential issue for enterprises to improve their market competitiveness. Deep learning, as a necessary technical means of artificial intelligence, provides enterprises with more intelligent and precise data processing tools.

**OBJECTIVES:** The primary purpose of the study is to solve the problems of marketing data management in traditional enterprises and to achieve better integration and management of data through deep learning technology. Specifically, the goal is to explore the potential of deep learning in improving data processing efficiency and accurately analyzing user behavior and trends. By achieving these goals, organizations can better understand market needs, develop more effective marketing strategies, and stand out in a competitive marketplace.

**METHODS:** This study adopts a comprehensive approach, including a literature review, case study, and empirical analysis of deep learning algorithms. First, the main issues of current enterprise marketing data management and the latest progress in deep learning were understood through an in-depth study of the literature in related fields. Second, several enterprise cases were selected to gain a deeper understanding of the challenges and needs of enterprises in marketing data management through field research and data collection. Finally, a series of deep learning algorithms were designed and implemented to validate their effectiveness in real-world applications and analyze their impact on data integration and innovation paths.

**RESULTS:** The results of the study show that deep learning has significant advantages in enterprise marketing data management. By using deep learning algorithms, enterprises are able to handle large-scale marketing data more efficiently and achieve intelligent data integration and accurate analysis. This not only improves the efficiency of data processing but also provides enterprises with deeper market insights that help develop more targeted marketing strategies.

**CONCLUSION:** The results of the study are of guiding significance for enterprises to realize data-driven marketing decision-making, which provides strong support for enterprises to maintain their competitive advantages in the highly competitive market. Future research can further explore the application of deep learning in different industries and scenarios, as well as how to optimize deep learning algorithms further to meet the changing needs of enterprises.

**Keywords:** deep learning, enterprise marketing, data management, data integration

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## 1. Introduction

The digital economy is the second largest economic trend after agriculture and industry. In 2020, China's digital economy realized a growth of 35.8 billion yuan,

accounting for 36.2% of GDP growth, highlighting that the digital economy is gradually becoming a key driver of China's economic growth (Khan et al., 2021). This is not just a superficial phenomenon of economic growth but also symbolizes the profound changes that industries are

experiencing, accompanied by the wave of entering the digital economy era in all areas of society (Claudet et al., 2021). The digitalization trend is becoming more pronounced in the development of different industrial sectors, from manufacturing to services to education and healthcare; all industries are actively exploring ways of digital transformation (Sukhareva et al., 2021). In the workplace and daily life, emerging concepts such as "digital," "traffic," and "big data" are gradually penetrating, leading people to adapt and apply these concepts to promote a more efficient and more thoughtful society (Rumyantseva et al., 2021). This wave of digitization highlights the need for a more efficient and more innovative society. This wave of digitization highlights the fact that digital technologies such as cloud computing and artificial intelligence are not just technological innovations but are also profoundly changing people's lifestyles and comfort levels (Gazzola et al., 2021). Cloud computing provides more flexible and convenient solutions for storing and processing information. At the same time, artificial intelligence has demonstrated a fantastic level of intelligence in a variety of fields, driving the continuous progress of science and technology. However, this change brings both opportunities and challenges (Schwarzbach et al., 2023). In the process of digital transformation, enterprises need to continuously adapt to new technologies and cultivate digital talents to grasp the opportunities better. At the same time, the digital society also faces challenges in information security and privacy protection, which require comprehensive consideration of the balance between technological innovation and legal regulation (Tuan et al., 2021). All in all, the strong growth of China's digital economy in 2020 marks the rise of the digital era. This era has not only shaped the shape of the economy but also profoundly changed the way people live, bringing new possibilities and challenges for future development.

In recent years, the rapid evolution of the digital economy and its intersection with high technologies such as the Internet, cloud computing services and artificial intelligence have profoundly shaped and reconfigured the structure and model of business and industry (XIAPeng, 2022). This series of technological and development trends has brought extensive and far-reaching development opportunities for the Internet sector, accompanied by a series of challenges. Against this backdrop, leading companies such as Alibaba and Tencent have not only achieved significant growth but have also triggered profound industry-wide change and impact (Karpovich, 2022). The trend towards digitization has become a core factor affecting various traditional industries. Several traditional industries have achieved significant operational and service improvements by adopting digital reforms. In the face of this wave of digitization, enterprises need to comprehensively review and reposition their business models and strategies to adapt to this ever-changing business environment (Cui et al., 2021). Against the backdrop of technological and business transformation, traditional marketing models are

undergoing profound changes and rapid transformation towards digitalization. With the trend toward digitalization of consumer behavior and the rise in Internet penetration, companies need a more precise and intelligent approach to formulating their marketing strategies in order to more effectively establish and maintain a connection with their target audience (Kumbhojkar & Menon, 2022). As the wave of digitization sweeps across the world, there is a growing demand for professionals in the field of digital marketing. Many companies are looking for talents with specialized skills in digital promotion, new media operation, e-commerce marketing, data analysis, etc., to get or stay ahead of the curve in the digitized competitive environment (Klymchuk et al., 2021). Statistics show that companies, including Zoomlion, are showing a clear preference for talents in the field of digital marketing, such as digital promotion specialists, new media operation managers, e-commerce marketing experts, data analysts, and senior marketing strategists (Prokhorova & Chobitok, 2021). Taken together, the rise of the digital economy has not only injected strong vitality and momentum into the Internet industry but also brought unprecedented opportunities and challenges to the digital marketing field, which provides a wide range of space and possibilities for companies to find and open up new growth paths in a competitive market environment.

## 2. Background of the study

By 2020, the demand for online marketers will rise to 15 million, but the actual supply will be just 5 million - a difference of 10 million. By 2025, the talent shortage is expected to reach about 40 million people. Currently, China's higher education institutions face a number of challenges in training digital marketing professionals, including but not limited to curriculum design, teaching methods, and close ties to the industry (Tyshchenko, 2022). Although some reforms have been made to address these challenges, data suggests that companies are not satisfied with the training of professionals in the field of digital marketing. This highlights where the talent pool and training model for the digital marketing field is in dire need of improvement (Caldevilla-Domínguez et al., 2021). To address the shortage of digital marketing talent in the United States, the Business Analytics Program was launched in 2007. The program aims to integrate business, information technology and statistical knowledge to cultivate digital marketing professionals adapted to the era of big data. The program not only focuses on teaching theoretical knowledge but also emphasizes the cultivation of practical skills to cater to the complex and rapidly changing environment of the digital marketing field (Abdulaal et al., 2023). In addition, the program works closely with industry players to ensure that the training content matches the actual market needs. Through internships, lectures by industry professionals, and project partnerships, students are able to gain hands-

on experience in natural business environments and gain a better understanding of the challenges and opportunities in the digital marketing industry (Makrydakis, 2021). Overall, the business analytics program is expected to fill the gap in digital marketing talent training in China, providing students with more comprehensive and practical knowledge to better adapt to the challenges of the digital era. The 2018 National Education Conference builds on existing developments in the business sector, proposes the concept of a new enterprise in higher education, and creates a new talent training system to meet the needs of time and business talent training (Gopal, 2021). Nearly 30% of universities are placing more emphasis on digital marketing, and many have changed their business education, in part due to an increase in education in similar fields. However, according to Chinese advertising agencies, there was still no clear and appropriate direction for developing business talent in the 1920s, nor was there a way to rethink learning paths and integrate relevant subject knowledge. Failure to produce high-quality digital marketing talent for the significant data era.

Provide constructive suggestions and recommendations for the development of highly qualified university employees from an educational point of view. The digital marketing skills model can help marketing students update their study habits, set clear learning goals, and develop talent that meets business competency requirements (Luhtala et al., 2021). In addition, the development of digital marketing skills enables students to develop more comprehensive and systematic pedagogical skills on campus, expand their digital horizons, develop digital thinking, and provide a standardized channel for students to understand digital marketing (Sun, 2021). Digital marketing is a way for companies to collaborate with customers and partners and a tailored technology process for creating, communicating, delivering, and maintaining value for all stakeholders. Digital marketing is also essential to researchers (Mukherjee, 2023). Some researchers use big data techniques to define large amounts of complex data built on multiple platforms. Regarding digital marketing, scientists agree that it is a form of technology marketing that utilizes a variety of information and information technologies for the overall application of marketing.

### 3. Research methodology

#### 3.1 Research Objects and Tools

In the qualitative research phase, data and ideas are collected through in-depth interviews and theories are analyzed using reliable data. Learning about high-quality research usually requires much time, complex processes, and a heavy workload. This section describes quality assurance methods. Interactive communication helps to understand the respondents' views on digital marketing and the possibilities of digital marketing. There are many selective approaches to in-depth interviews. The

interviewer should have the experience, knowledge and ability to identify the primary sources of the research questions and make them credible. Therefore, the sampling method used in the experiment is the target sample. The research model is shown in Figure 1.

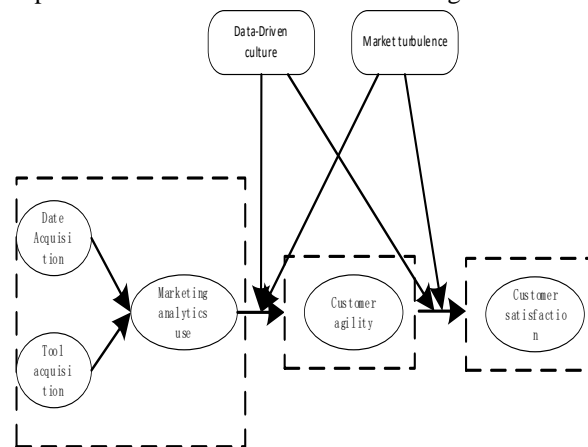


Figure 1 Research model

Nine in-depth interviews were conducted, each lasting about half a day for about five months. From a macro perspective, it can provide the skill elements for finding good digital marketers. Therefore, the interviewees selected for the study can provide the most comprehensive and holistic information and perspectives for building a highly reliable digital marketing competency model. In addition, due to the anonymity and confidentiality of the interviews, the specific company names of the interlocutors were not mentioned; instead, the call time codes Y1-Y9 were used.

The tools used in this study are an interview recording tool, a cell phone, and an audio computer. This application can convert a large number of recordings into text in a very short period. Although errors may occur, this can significantly reduce the time it takes scientists to convert recordings to text and improve performance. Analysis tool: NVivo 11 software, commonly used for qualitative analysis. Qualitative studies often include large amounts of textual data and software that stores this data in a variety of formats and codes and analyzes it directly to provide a clear basis for coding. Rating analyses were performed directly at each stage of coding. The model structure results are shown in Figure 2.

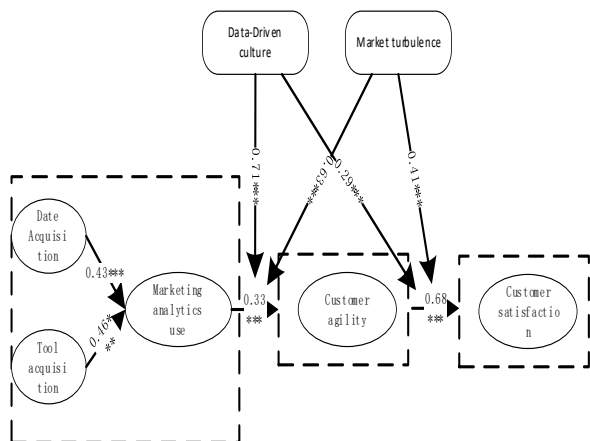


Figure 2 Model structure results

### 3.2 Relevant theories

This paper provides an in-depth analysis of the interview data using robust theory. Root theory is a research methodology rather than a general "theory" designed to create a generalization about the data. The theory is primarily based on relevant sociological research. One of the characteristics of grounded theory is that it is a 'generative' theory, which aims to extract raw knowledge from practical experience and abstract concepts from raw data and develop a systematic theory. Unlike other approaches, this is a gradual process from small to large. It is first approved and then gradually tested. Due to the continuous research and development of researchers, there are three main directions in root theory: classical root theory, program root theory and root structure theory. The coding part of this paper focuses on the research phase of protocol theory, which is briefly described below. In 1987, Software Earth Theory was born.

Open coding is the first step in the coding process. It consists of sequential coding of the actual content of the interview text or subtle coding of information based on the interview text, separating concepts or themes from the original sentence, and classifying and organizing the concepts in the original text to obtain different categories. The name of the category must be taken from the existing literature or the received text. Most researchers favor obtaining "local" data from interviews. This step is the basis for further coding. In open coding, the programmer must move away from previously held concepts and remain open without inherent concepts or theories. Second, although most concepts cannot be used in the theoretical framework of coding, existing interview texts should always be coded with as much care as possible until they become dull and miss conceptual moments.

The open coding process described above allows researchers to extract separate, independent and unique terms and categories from the source code. On the other hand, time-zone coding based on open coding summarizes the analysis, discovery and consolidation of different

relationships between conceptual categories. It shows the organic relationships between different parts of the data and extracts the underlying categories. In a study, the researcher can analyze one concept or category at a time in detail and combine it with other categories or concepts. These categories are called primary categories. The names of the main categories can be separated from the defined categories or structurally called new names.

Major categories are those that may be relevant and have a decisive or direct impact on other categories. It is possible to get as much research as possible from a relatively broad range of theories and be on the leading edge. This is the primary process of root theory-based process coding research. It is a gradual and continuous process of comparison and summarization, each of which requires the extraction of relevant high-level abstractions, and finally, with the help of literature analysis and secondary data collection, which was followed by in-depth or semi-structured interviews to discuss the participants' research questions. Once the raw material was collected, the ingrained tertiary coding theory was applied to source code coding and analysis to summarize and extract elements of digital marketing talent know-how.

### 3.3 Deep Learning Theory

Given the complexity of traditional algorithms, many have focused on deep learning in recent years. Marketing a data reconstruction network with deep learning not only retains the complex features of neural networks but also enables effective reconstruction. At the same time, it utilizes powerful, profound learning opportunities for high-quality reconstruction, effectively combining the advantages of two traditional reconstruction algorithms. In addition, deep learning networks play a crucial role in solving these noise and virtual noise problems. Noise cancellation networks and deep learning pseudo-cancellation networks are designed to recover or process the image in the image region. The projected region is limited, and there is no combination. By analyzing the characteristics of marketing data management, there is a natural link between design and reconstruction, which is the aspect of reconstruction. The projection area is the most original information in marketing data management, while the reconstruction area is the final result of marketing information management. If the reconstruction and projection areas are treated separately from the marketing data, marketing data management will become a standard image processing problem, and the essential information in the reconstruction and projection areas will be artificially lost. To solve this problem, some studies have used a staged strategy, first in the projection region, then in the reconstruction region using the traditional FBP algorithm, and finally in the reconstruction region. The multilayer processing strategy loses the complexity of the neural network and extends the gradient independently in the reconstruction and projection areas. The

reconstruction of the network achieves a direct slope change from the reconstructed region to the projected region, and the reconstructed region data makes it possible to manage parameter updates in the projected region for better results. However, due to the significant parameters, existing reconstruction networks cannot be directly scaled to 3D, which is the main reason for practical applications. Conventional deep learning algorithms and methods effectively eliminate distractions and human factors in marketing data management.

The deep learning model is as follows:

$$w_{ij} = \exp\left(-\frac{\|F_i - F_j\|^2}{\sigma^2}\right) \quad (1)$$

Where  $exp$  is the mathematical expectation of  $W_{ij}$  for weighting.

$$h_{ij} = \begin{cases} \frac{1}{\sqrt{vol(A_j)}}, V_i = A_j \\ 0, V_i \notin A_j \end{cases} \quad (2)$$

Where  $A$  is a specific sequence of vectors.

$$h_i^T L h_i = cut(A_i, A_j) / vol(A_i) \quad (3)$$

$Cut(A_i, A_j)$  is the repositioning of the column.

$$\arg \min tr(H^T D^{1/2} L D^{1/2} H) = 1 \quad (4)$$

$H^T H$  is a series of algorithmic reconstructions of  $s.t.$

$$Y_{ij} = Y_{ij} / \left(\sum_j V_{ij}^2\right)^{1/2} \quad (5)$$

$V$  is a representation of a random vector over a sequence of vectors.

## 4. Results and discussion

### 4.1 Enterprise marketing data management integration model construction

In the area of qualitative research, the survey was based on online direct interviews due to time or location constraints. Prior to the interviews, the researcher examined the interviews based on literature research and secondary data collection. However, during the interview process, the study used a semi-structured format, and the interview program only presented ideas that needed to meet expectations fully. During the interviews, the researcher and the respondents were free to communicate about the research topic, which allowed for more flexibility and supported initiative in the topic. A comparison of the OPEN and High models of deep learning is shown in Figure 3.

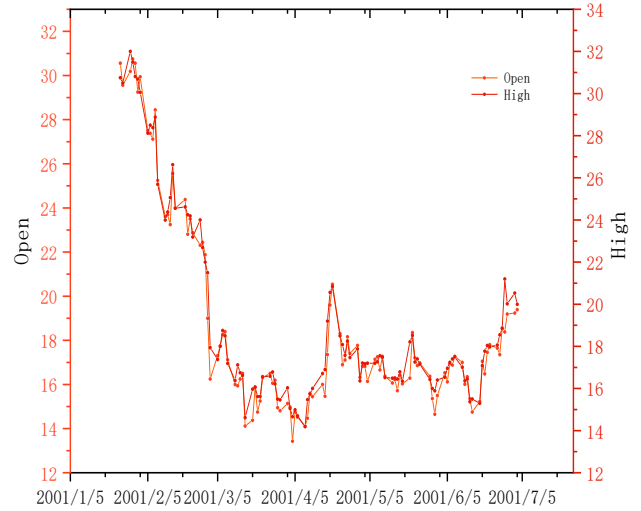


Figure 3 Comparison of OPEN and High models for deep learning

Based on literature research and secondary data analysis, the first interview draft of a digital marketing talent model was developed. It consists of three components: changes at the marketing department or organization level, changes in qualification requirements for marketers, changes in firm-level marketing strategy, and open questions about the program. The first assumption of these three components is that the changes described by respondents are changes in business, human resources, and marketing strategies impacted by ABC-led digital technologies, big data, and cloud services.

As a first step, find out if the organizational structure of frontline departments has changed, if some departments have been created or deleted as a result of the digital transformation, if traditional jobs have changed, and if new digital jobs have been created. Changes in the structure or positions in these departments will provide an understanding of the company's needs and capabilities for digital marketers. A: "What changes have been made to the organizational structure, who has influenced the marketing department or user services, have new departments been created, and what are the marketing goals of that department?" There have been changes in the organizational structure and its main tasks that have led to these changes. Marketing Analysis. The second part is a straightforward question. Interviews with marketers provide direct insights into changes in marketing skills and how these changes have occurred. For example, "What new needs have been created by changes in digital marketing?" What kind of marketing skills are needed? A: What are the critical aspects of the Internet's impact? In a broader context, it is possible to understand the changes in marketing and to analyze and extract the knowledge needed for different digital markets. A comparison of Close's algorithm with Volume's is shown in Figure 4.

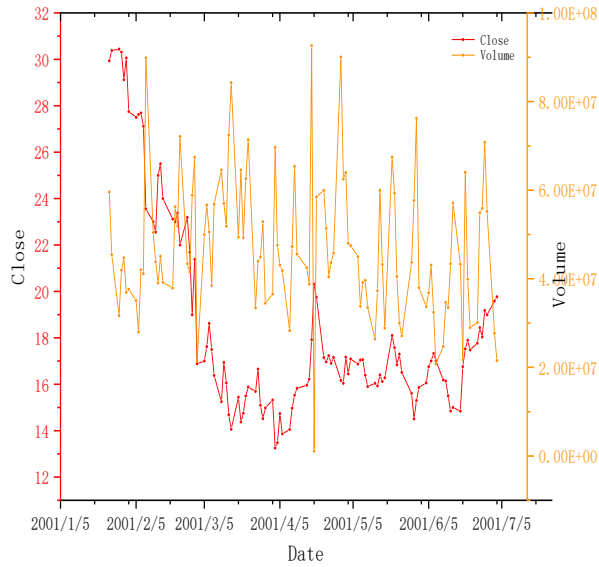


Figure 4 Comparison of algorithms for Close and Volume  
 In the interview portion of the study, nine marketing managers were interviewed directly by local researchers, with each interview lasting 1-2 hours for a total enrollment time of approximately 12 hours. The audio files were first prepared using the audio tool described above and then corrected verbatim by the authors. During the analysis phase, eight interview texts were coded and re-analyzed, one of which remains in saturation testing.

The writer first coded the original document and then gave it to a specialized instructor for correction. The first valid part of the interview is open coding, which refers to the skills of the relevant digital marketing specialist. After importing the text into NVivo, use the node software to code the raw text. In coding, it is essential to remain open to analyzing specific concepts in the proposal or paragraph based on the content of the different texts and then categorizing the original concepts. Most code names used the original sentences mentioned in the themes, but more mature concepts used existing names directly. During the open coding phase, 130 concepts and 21 categories were selected.

At the final coding stage, selective coding not only clarifies the main categories but also identifies specific categories that dominate the others while allowing for clever categorization of each category into another. The Digital Marketer Competency Model is centered on the "digital mindset" as a critical building block for significant impact in the digital age. During the interviews, respondents agreed that the digital mindset is a business unit that employees should develop and be equipped with. As the role of data in the digital age continues to expand, it is especially urgent to maintain a mindset of solving digital problems. It is worth noting that the digital mindset is iteratively inherited. Although it is not used directly to perform specific tasks, it is essential to learn it for real-world tasks. The findings suggest that "digital thinking" serves as a cornerstone for the different skill categories in the Digital Marketing Talent Critical Competency Model while encouraging other domains to

co-construct the cost-opportunity model. In order to assess the saturation of the coding analysis, the interview texts were stored as saturation test material in this study. However, coding analysis of other interview texts did not reveal new concepts or original categories, suggesting that such models and elements of digital marketing may have received sufficient attention but also reminding us of the need to explore their potential possibilities in greater depth. Overall, the criticality and prospects of digital thinking in the field of digital marketing deserve more profound investigation. A comparison of High and Low for deep learning is shown in Figure 5.

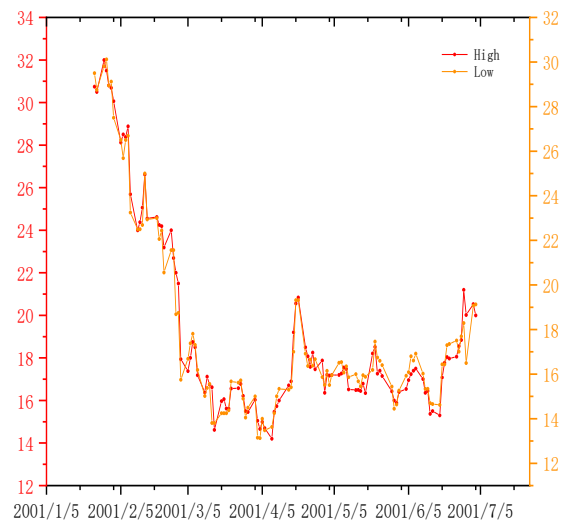


Figure 5 Comparison of High and low for deep learning

#### 4.2 Significance of Enterprise Marketing Data Management Integration Modeling

The Digital Marketing Skills Model is a framework developed through the revelation of qualitative research. The model covers four main dimensions and contains eighteen specific elements, namely professional skills, digital skills, generic skills and digital thinking. An in-depth analysis of this model is essential to understand the complexity of digital marketing and the connections between the elements. First, professional skills, one of the critical dimensions, covers a wide range of specialized domain knowledge, such as market analysis, brand management, and marketing strategy. Another critical dimension is digital skills, focusing on the use of various tools and techniques in the digital environment, such as data analytics, social media management and search engine optimization. The third dimension is generic skills, which include abilities such as teamwork, communication skills and creative thinking. These skills are critical for digital marketing teams to work together. In this framework, digital thinking is critical as the fourth essential dimension. Digital thinking emphasizes the need for marketers to have an awareness of problem-solving and a corresponding mindset in the digital age. It is not

just about understanding data but also about having a deep and comprehensive grasp of information insights in order to strategize and make decisions more effectively. The importance of a digital mindset has been well documented in research, thus proving it to be one of the critical elements of digital marketing success. Next, the Author will delve deeper into the specific elements under each dimension in order to understand the inner structure of the digital marketing skills model more fully and explore its substantial impact on business success. In the digital age, digital thinking must be the internal genome of the company; the company, the team, and everyone must know the value of data and be able to analyze it in decision-making.

Digital thinking at the business level is reflected in internal management systems, and external data management (e.g., the ability to store customer consumption and purchase documentation) allows for real-time monitoring of the effectiveness of marketing programs. The departmental, team and individual data can now be used to build data-based consensus, consult and support internal team ideas in decision-making processes, and identify the causes of data problems. Thinking about data is final, and creating content without data is pointless; the interview says that changing mindsets is paramount and that companies must first have an idea of what information is. Ideas can only come from the bottom up if there is a conscious effort to start at a higher level. In the current context of academization, data analytics is seen as a way of knowing that is based on a data mindset that goes beyond the mere application of technological tools.

Placing the data perspective at the forefront emphasizes thinking about data as central to the problem-solving process. This approach requires systematic data collection, fine-grained analysis, and in-depth interpretation to gain insights. In order to indeed have a dominant sense of problem-solving, digital thinking must permeate multiple aspects of the overall skill model, which covers the efficient collection and organization of data, the mastery of analytical methods, and the straightforward interpretation of results. It is only through this holistic approach to digital thinking that the Author will be able to respond more effectively to increasingly complex and volatile challenges. The rapid development of the digital age requires us to go beyond the application of data and to continuously learn and adapt to change through the in-depth use of digital thinking, which means constantly updating personal skills and learning the latest data science and analytics tools to ensure that the Author remains competitive in the digital age. Only by keeping up with the pace of the digital age will the Author be able to harness the potential of data better to create more excellent value for individuals and organizations. In this fast-changing data environment, digital thinking is not just a skill; it is a crucial competency to meet the challenges of fast-changing data. By integrating digital thinking throughout the problem-solving process, the Author is able to sense changes more acutely and adjust

our strategies more flexibly, thereby responding more efficiently to the ever-emerging data challenges. Therefore, developing a digital mindset has become an indispensable part of success in today's digital age.

Professional skills are the basic theoretical knowledge and core skills that marketers need to acquire to implement various workflows and include four elements: specialized marketing skills, consumer knowledge, channel handling skills and marketing design skills. Skills should be applied to different industries, whether it is online manufacturing or traditional manufacturing with employees. Marketing specialization is the accumulation of theoretical knowledge of the fundamentals of marketing and the ability to apply that knowledge intelligently in practice, not just theoretical analysis and problem-solving. In the interviews, everyone talked about the importance of managing marketing skills. Digital or traditional marketing is one thing. At its core, it is about the fundamentals of marketing, and mastering these theories is a springboard for recent graduates into the world. During the interview process, graduates also ensure that young graduates have sufficient knowledge and understanding of the specialized content. One professional trend in recruiting digital marketing specialists is that command has indicated its preference for recruiting marketing majors because of the emphasis on the basics. Data analysis can be collected in the workplace, but it is only possible with specialized knowledge.

Though marketing has evolved, the core of consumers has remained the same, from traditional marketing to digital marketing. Therefore, it is crucial to have a grasp of some traditional theories, such as consumer behavior. Traditional marketing theories are the foundation of marketing efforts, and many aspects, such as packaging and implantable advertising, are based on this theory. Collectively, the key to success in the digital marketing field is having deep marketing skills. It is not just an essential requirement for a job; it is a core element in driving business growth. Effectively acquiring and applying knowledge of marketing theory is seen as a crucial part of achieving digital marketing goals. However, more than relying on theoretical knowledge is needed to ensure success; these skills must be deepened and consolidated through practical exercises and management. Digital marketing efforts are no longer just about the application of theory but require the ability to translate ideas into practical action. Only by applying what people have learned to real projects and being adept at solving practical challenges can people genuinely demonstrate the level of a digital marketing professional. Therefore, an integral part of digital talent marketing is combining theoretical knowledge with practical experience to form a unique and effective working method, which explains why the need for marketing skills is emphasized in digital talent marketing. In the digital age, with highly competitive markets and changing consumer behavior, it is no longer sufficient to rely solely on traditional marketing methods. Digital marketing requires a more flexible and innovative mindset, which is

cultivated through in-depth research and superb marketing skills. Therefore, the success of digital marketing depends not only on the mastery of theoretical knowledge but also on the need to translate this knowledge into creative and practically feasible strategies and programs to meet market demands better.

In conclusion, the emphasis on marketing skills in digital talent marketing is a critical factor in ensuring that people stand out in the highly competitive field of digital marketing. Through continuous learning and practice, digital marketing professionals are better able to adapt to market changes and drive organizations to achieve their business goals. In the digital era, it is essential to focus not only on the accumulation of theoretical knowledge but also on implementing it into innovative and practically feasible strategies and programs to meet the ever-changing market demands. The deep learning path is shown in Figure 6.

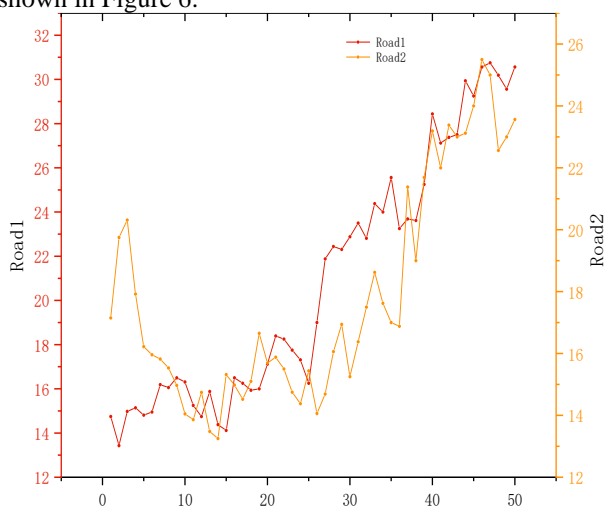


Figure 6 Deep learning path

Consumers influence surveys or interviews in many ways. However, behavioral data can be collected more reliably than words, and interviewees also pointed out that so far, only various questionnaires or workshops have been used to understand consumer needs and group characteristics. The digitization of consumer behavior makes it easier to sell consumer interest because behavior is more realistic than words. In this study, consumer understanding refers to the understanding of consumer needs and their ability to change over time and circumstances. The process of documenting consumer needs goes far beyond simple surveys or data analysis; it goes deeper and involves understanding the sensitivity of different groups or scenarios to changing needs. For example, in in-depth interviews, respondents indicated significant differences in product concerns among individuals of different ages, highlighting the diversity and complexity of consumer needs. In terms of expanding the characteristics of the channel, the priority is to understand the new market environment continuously. This includes not only keen insights into market trends and the competitive landscape but also paying attention to the constant evolution of social media platforms. Familiarity with the rules and

practices of these platforms is critical to keeping the channel alive, as they directly impact a brand's visibility and influence in the digital space.

Managing and fully utilizing these platforms involves not only attracting new users but also skillfully retaining existing users. This involves employing innovative strategies such as personalized recommendations and customized services to meet the needs of different users. It is also crucial to manage traffic capacity to ensure that the brand remains compelling and continues to grow in the digital space. In today's Internet age, the interaction between businesses and consumers has become much closer. Companies are not just providers of products or services but are directly involved in consumer discussions. This direct interaction provides more opportunities for branding, enabling a deeper understanding and fulfillment of consumer expectations. With direct discussions made possible on various digital platforms, brands can more actively interact with consumers and listen to their feedback, thus continuously optimizing their products or services and promoting a strong connection between brands and consumers. This two-way communication model helps to break down the traditional barriers between companies and consumers, resulting in a closer and more synergistic relationship. Social media continues to gain importance in today's branding practices. These platforms offer critical opportunities for brands to capitalize on diverse features and functionality to build close connections with a wide range of audiences. By posting a diversity of content, including but not limited to uploading brand-featured videos on Jieyin, answering questions related to well-known brands, and posting engaging articles, brands are able to attract new users and solidify the loyalty of old ones, thus maintaining a highly effective appeal to their audience. Some brands have helped to increase brand awareness and uniqueness by crafting a unique brand image on intellectual property (IP) social media platforms. The use of social media allows brands to gain a deeper understanding of consumers' actual needs and preferences so that they can design products in a targeted manner and develop more creative and targeted marketing campaigns. This two-way interaction allows consumers to express their support and recognition of the brand's philosophy in their unique way, which promotes a closer connection between the brand and the consumer. In addition, the differences in the characteristics of user groups on different social media platforms provide brands with a convenient place to collect data in order to obtain information and opinions from consumers.

Therefore, an in-depth understanding of the characteristics of mobile social media platforms such as WeChat and Weibo is particularly crucial. In digital marketing discussions, an in-depth understanding of WeChat's audience and services, as well as familiarity with the rules and regulations of each live platform, are emphasized as essential factors for successful marketing. Being adept at utilizing the software's features flexibly plays a crucial role in making brands stand out in a competitive



marketplace. Taking social media courses in business schools and familiarizing themselves with different digital marketing platforms is a new challenge for digital marketers. First of all, one needs to understand how to market channel tools, such as the Shake platform, as well as the ability to create short videos. For example, if there is now a public number on WeChat, it will be less commercialized, and consumers will only pay attention to bigger, more advanced models. In short, managing different marketing channels is a prerequisite for the digital marketing era. Deep learning Volume comparison is shown in Figure 7.

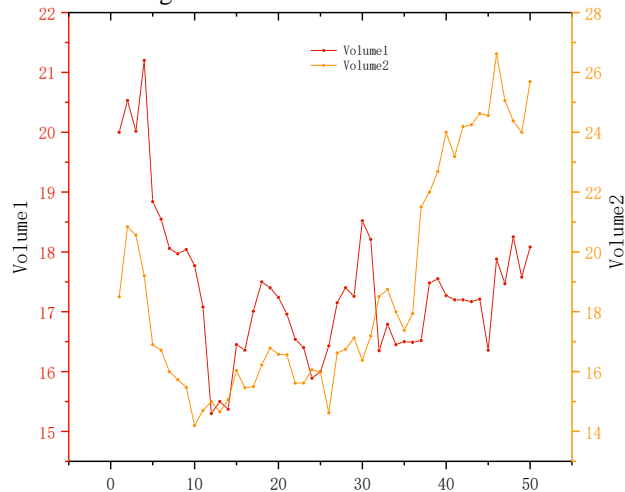


Figure 7 Deep Learning Volume Comparison

In traditional marketing, marketing planning is based more on company objectives, market research, product presentation design and offline marketing development. As mentioned in Part III, in the digital age, more and more brands are engaging in marketing to draw attention to new media online behavior. However, all new media platforms are just media. What is published and what it is intended to do is very important to consumers. The value of content and operations, innovation and creativity, and capturing consumer bottlenecks have a significant impact on marketing effectiveness. For example, one-to-one coding technology allows consumers to scan a QR code on a bottle cap, write down the word they want to say and create their bottle. If branded content can be produced and rolled out on a national scale, it complements the channel function, and brand marketing on every new media platform is part of the combination of these two functions. A Date comparison of the algorithms is shown in Figure 8.

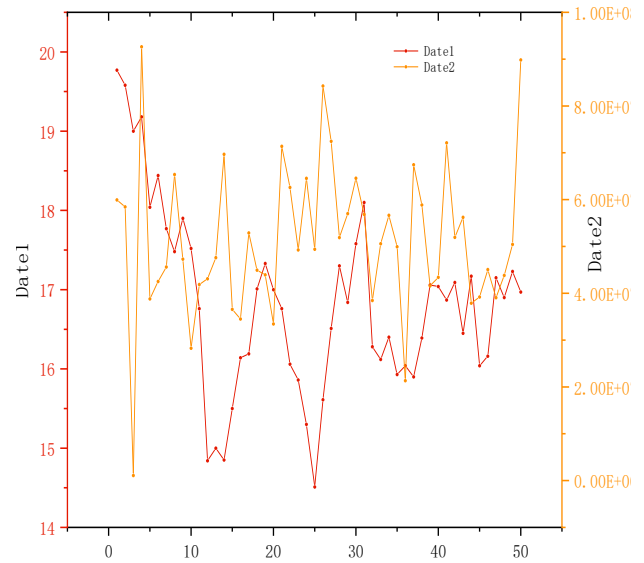


Figure 8 Date comparison of algorithms

## 5. Conclusion

Deep learning shows great potential for enterprise marketing data management integration and innovation paths. First, deep learning technology provides powerful data processing and analysis tools for enterprises. With deep learning algorithms, enterprises can process large-scale marketing data more accurately and quickly to gain deeper insights, which helps enterprises better understand customer behavior, market trends and the competitive environment, providing strong support for decision-making. Second, deep learning plays a crucial role in personalized marketing. Through the learning and optimization of deep learning algorithms, companies are able to personalize their marketing strategies based on individual customer needs and preferences, which not only improves marketing effectiveness but also enhances customer loyalty to the company. In addition, the application of deep learning promotes the integration of cross-channel data. An organization's marketing campaign usually involves multiple channels, including online and offline, social media, email, and so on. Deep learning technology can help enterprises integrate these scattered data to form a comprehensive view of marketing data, improving their grasp of the overall market and reaction speed. In terms of innovation paths, deep learning offers more possibilities for enterprises. For example, by combining deep and augmented learning, organizations can explore automated decision-making systems that can more rapidly adjust marketing strategies in dynamic market environments.

In addition, deep learning can be used to predict future market trends and help organizations respond to potential challenges and opportunities in advance. However, despite its excellent performance in enterprise marketing data management, deep learning still faces some challenges in practical applications. The first is data privacy and security; deep learning requires a large

amount of data for training, but this may also involve sensitive information about user privacy. Second is the transparency and interpretability of the algorithms. Deep learning models are often considered black box models, and it is difficult to explain their decision-making process, which may be limited in some sensitive industries and fields.

In summary, deep learning-based integration and innovation paths for enterprise marketing data management are areas full of potential and challenges. With the continuous development of technology and in-depth research on related issues, deep learning will continue to play an important role in enterprise marketing and drive continuous innovation in the industry. When applying deep learning technology, enterprises need to comprehensively consider data privacy, algorithm transparency and other aspects to ensure a balance between technological innovation and social responsibility.

## References

- [1] **Journal article:** Abdulaal, R. M. S., Makki, A. A., Alfalali, I. Y., & Li, Ms. E. (2023). A Novel Hybrid Approach for Prioritizing Investment Initiatives to Achieve Financial Sustainability in Higher Education Institutions Using MEREC-G and RATMI. 65(65), 131–179. <https://doi.org/10.3390/su151612635>
- [2] **Journal article:** Caldevilla-Domínguez, D., Martínez-Sala, A.-M., & Báez, A. B. (2021). Tourism and ICT. Bibliometric Study on Digital Literacy in Higher Education. *Education Sciences*, 11(4), 172. <https://doi.org/10.3390/educsci11040172>
- [3] **Journal article:** Claudet, J., Loiseau, C., & Pebayle, A. (2021). Critical gaps in the protection of the second-largest exclusive economic zone in the world. *Marine Policy*, 124, 104379. <https://doi.org/10.1016/j.marpol.2020.104379>
- [4] **Journal article:** Cui, Y., Jiao, H., & Zhao, G. (2021). A Heuristic for All? A Multiple Needs Approach to Fairness Heuristic Formation in Digital Transformation in Chinese Work Organizations. *IEEE Transactions on Engineering Management*, PP(99), 1–13.
- [5] **Journal article:** Gazzola, P., Grechi, D., Papagiannis, F., & Marrapodi, C. (2021). The sharing economy in a digital society: Youth consumer behavior in Italy. *Kybernetes*, 50(1), 147–164. <https://doi.org/10.1108/K-12-2019-0796>
- [6] **Journal article:** Gopal, V. (2021). Conference Proceedings National Level Virtual Conference on E-Education, E-Learning, E-Management and E-Business (NC4E) Organizing Committee of NC4E. 45(45), 67–89.
- [7] **Journal article:** Karpovich, I. (2022). Adjustment of ESP curriculum to the needs of the digital university environment. *Uchenye Zapiski St. Petersburg University of Management Technologies and Economics*, 44(44), 34–73. <https://doi.org/10.35854/2541-8106-2022-3-205-211>
- [8] **Journal article:** Khan, A., Shah, A., Arafa, A., Soomro, N. E. H., & Advocate, M. (2021). Plurilateral Negotiation of WTO E-commerce in the Context of Digital Economy: Recent Issues and Developments. 34(34), 213–277.
- [9] **Journal article:** Klymchuk, M., Achkasov, I., Klymchuk, S., & Poliak, O. (2021). Influence of Risk Management on the Formation of the Enterprise's Business Process Management Strategy in the Digital Economy: The International Experience. *Business Inform*, 1, 272–278. <https://doi.org/10.32983/2222-4459-2021-1-272-278>
- [10] **Journal article:** Kumbhojkar, N. R., & Menon, A. B. (2022). Integrated Predictive Experience Management Framework (IPEMF) for Improving Customer Experience: In the Era of Digital Transformation. *International Journal of Cloud Applications and Computing*, 163(163), 1–56.
- [11] **Journal article:** Luhtala, H., Erkkil-Vlimki, A., Eliassen, S. Q., & Tolvanen, H. (2021). Business sector involvement in maritime spatial planning – Experiences from the Baltic Sea region. *Marine Policy*, 123, 104301. <https://doi.org/10.1016/j.marpol.2020.104301>
- [12] **Journal article:** Makrydakakis, N. (2021). Perceptions of Marketing & Digital Transformation in Greek Public Higher Education Organizations in the Context of Digital Darwinism. 1, 142–188.
- [13] **Journal article:** Mukherjee, S. (2023). The business model canvas of women-owned micro-enterprises in the urban informal sector. *Journal of Enterprising Communities: People and Places in the Global Economy*, 17(2), 398–418. <https://doi.org/10.1108/JEC-05-2021-0068>
- [14] **Journal article:** Prokhorova, V. V., & Chobitok, V. I. (2021). The Organizational and Managerial Provision of Business Processes Reengineering at Enterprise in the Conditions of Digitalization. *Business Inform*, 1(516), 279–285. <https://doi.org/10.32983/2222-4459-2021-1-279-285>
- [15] **Journal article:** Romyantseva, A., Sintsova, E., Sukhacheva, V., & Tarutko, O. (2021). The Impact of Digital Transformation on the Process of Russian Enterprises Entering International Financial Markets. IV International Scientific and Practical Conference, 122(122), 34–71.
- [16] **Journal article:** Schwarzbach, C., Eden, T., Werth, O., Lohse, U., Breitner, M. H., & Schulenburg, J. M. G. V. D. (2023). Digital Transformation in Back-Offices of German Insurance Companies. *International Journal of Innovation and Technology Management*, 20(08). <https://doi.org/10.1142/S0219877023500505>
- [17] **Journal article:** Sukhareva, E., Kakhalikov, M., Korolkova, A., & Sobolev, A. (2021). The organizational and economic mechanism for creating a digital environment in the energy sector. 147(112), 55–78. <https://doi.org/10.1145/3487757.3490858>
- [18] **Journal article:** Sun, H. (2021). Research on the Development of National Education Modernization under the Guidance of Concept Modernization. 46(46), 133–178. <https://doi.org/10.1145/3452446.3452461>
- [19] **Journal article:** Tuan, N. M., Hung, N. Q., & Hang, N. T. (2021). Digital transformation in the business: A solution for developing cash accounting information

- systems and digitizing documents. *T?P Chí Phát Tri?N Khoa h?C và Cng Ngh?*, 3(2), 45–77.
- [20] **Journal article:** Tyshchenko, S. (2022). Univariate Analysis of Variance as a Method of Solving Professional Pedagogical Tasks in Higher Education. *Modern Economic*, 67(67), 78–101. [https://doi.org/10.31521/modecon.V35\(2022\)-18](https://doi.org/10.31521/modecon.V35(2022)-18)
- [21] **Journal article:** Xia Peng. (2022). Analysis and Suggestions on the Trend of Promoting Digital Transformation in Petroleum and Petrochemical Enterprises. *Economic management*, 3, 44–47.