

# *Research on Building a Digital Leadership Capability Model: Requirements and Challenges of the Artificial Intelligence Era*

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**Keywords:** Digital leadership; the era of artificial intelligence; data-driven decision-making; innovative thinking; teamwork

**Abstract:** The purpose of this study is to build a digital leadership capability model adapted to the era of artificial intelligence to meet the challenges brought about by the rapid technology development and organizational operational change. A combination of literature review, interviews, questionnaires, and case analysis identified key competency elements of digital leadership, including technology literacy, data-driven decision-making, innovative and open thinking, and teamwork and communication skills. Taking Amazon as a case, this paper analyzes the successful elements and effectiveness of its digital leadership practice, and provides practical experience and lessons. The results highlight the importance of data-driven decision-making and innovative thinking in leadership in the era of AI, and provide guidance for organizational transformation and leadership capacity improvement.

## 1. Introduction

With the rapid development of technology and the deepening of globalization, we have entered the era of artificial intelligence. The wave of this era is reshaping the world at an unprecedented speed and scale, and both the social structure, economic form and business model are all undergoing profound changes. In this context of the era, the operation mode, decision-making process and the situation of enterprises and organizations in the market competition have also undergone earth-shaking changes. Digital transformation is no longer an option, but the only way for enterprises and organizations to survive and develop. However, a successful digital transformation will not be easy. It needs not only the update and upgrade of technology, but also an all-round change involving organizational culture, management concept and leadership style. And digital leadership is particularly important in this change. Digital leadership, in short, is the ability of leaders to effectively guide and drive organizational change in a digital environment. This ability is not a single technical skill, but a comprehensive quality. It requires leaders not only to have deep technical literacy, to understand and apply the latest technological achievements, but also to have forward-looking strategic vision, insight into the future market changes, and innovative thinking and strong teamwork skills. Only with these capabilities can leaders make accurate judgments in a rapidly changing environment, develop scientific strategies, and lead the organization to

continuously innovate and develop. However, the rapid development and application of AI technology has also brought new challenges to leadership. With the speed of technology, leaders must keep learning to keep pace with The Times. At the same time, the introduction and application of new technologies is often accompanied by the adjustment of organizational structure and business processes, which requires leaders to have strong change management ability, can effectively coordinate all resources, and promote the smooth progress of change. To address these challenges, this study aims to build a comprehensive and systematic model of digital leadership competence. This model will analyze the new requirements of AI, define the key abilities and qualities of the leader, and provide practical guidance for the training and development of leaders<sup>[1]</sup>. Through the application of this model, we expect to help leaders to better navigate the digital wave in the era of artificial intelligence, and lead organizations to achieve greater success and development.

## **2. Literature review**

### **2.1. Development course of leadership theory**

Leadership, as a core element of organizational behavior and management, has always been widely concerned by scholars. From the early trait theory to the behavior theory, and then to the modern situation and contingency theory, the leadership theory has experienced continuous evolution and development. Trait theory mainly focuses on the influence of leaders' personal traits on leadership efficiency, such as wisdom, determination, confidence, etc. However, this theory ignores the role of situational factors and is therefore challenged by the subsequent theory. Behavior theory puts more emphasis on the behaviors of leaders, such as democratic and autocratic behaviors, and believes that these behaviors will directly affect the performance and satisfaction of employees. But this theory also has limitations because it ignores the importance of leaders interacting with employees. In modern times, the theory of situation and contingency began to dominate. Context theory emphasizes that leadership behavior should be adjusted according to different situations to achieve optimal leadership effectiveness. The theory of change further points out that no way of leadership is generally applicable, and leaders should choose the most appropriate way according to the internal and external environment of the organization, the characteristics of employees and the nature of the tasks. In addition, with the development of globalization, informatization and digitalization, the leadership theory is constantly advancing with The Times<sup>[2]</sup>. For example, new leadership concepts such as transformational leadership and service-oriented leadership have gradually attracted the attention of scholars. These ideas emphasize that leaders should have innovative thinking, an open mind, and a global perspective to adapt to the needs of the rapidly changing era.

### **2.2. Related research on digital leadership**

Digital leadership is an emerging research field in recent years, which mainly discusses the abilities and qualities that leaders should have in the context of the digital age. Compared with traditional leadership, digital leadership pays more attention to leaders' technical literacy, data-driven decision-making ability, innovative thinking and open mind. Existing research shows that digital leaders should have the following key capabilities: first, they need to have profound technical literacy, and be able to understand and apply emerging technologies such as artificial intelligence and big data; second, they need to have data-driven decision making and use data analysis and mining to guide strategy development and daily operations; finally, they need to have innovative thinking and open mind to encourage employees to develop new ideas and try new

things. In addition, digital leadership also emphasizes the interaction and collaboration between leaders and employees. In the digital age, the boundaries of organizations are becoming increasingly blurred, and teamwork and cross-departmental collaboration have become particularly important. Therefore, digital leaders need to have good communication skills and teamwork skills to promote cooperation and coordination within the organization<sup>[3]</sup>.

### **2.3. Applicability and limitations of the existing research in the era of artificial intelligence**

Although the existing research has discussed the digital leadership in depth, there are still some applicability and limitations in the context of the era of artificial intelligence. First, in terms of applicability, existing research focuses on the abilities and qualities of digital leaders, but less involved on how to apply these abilities and qualities to practical work. In the era of artificial intelligence, the technology update speed is extremely fast and the application scenarios are diversified. Therefore, how to combine the theory and practice of digital leadership has become an urgent problem to be solved. Secondly, in terms of limitations, the existing studies mainly explore and analyze them based on western cultural backgrounds while ignoring the problem of differences under different cultural backgrounds. For example, in the context of Chinese culture, factors such as "relationship" and "human relationship" may have an important impact on the implementation of digital leadership, but existing studies have rarely addressed them. In addition, with the continuous development of technology and the continuous expansion of application scenarios, the challenges and problems of digital leadership will constantly change and evolve. Therefore, the existing research may not be able to fully adapt to the needs and development trends of the new era. Therefore, future research needs to pay more attention to the differences in practical application scenarios and cultural backgrounds, and constantly explore and innovate to meet the needs and challenges of the era of artificial intelligence<sup>[4]</sup>.

## **3. Construction of the digital leadership capability model**

### **3.1. Model construction**

In constructing the digital leadership ability model, we adopted multiple research methods to ensure the comprehensiveness and accuracy of the model. First, we gathered digital leadership on their understanding and practical experience by interviewing experts and leaders in the industry. These interviews provide us with valuable first-hand data to help us deeply understand the application and challenges of digital leadership in practical work. Second, we designed an exhaustive questionnaire to further explore the key elements of digital leadership in a quantitative analysis manner. The questionnaire covers different enterprises and organizations of different industries and sizes, ensuring the universality and representativeness of the data. Through the statistical analysis of the questionnaire survey data, we can identify the core competencies and qualities of digital leadership. In addition, we also conducted an in-depth case analysis, and selected the enterprises and organizations that have achieved remarkable results in the digital transformation as the research objects. By analyzing these cases, we are able to extract the key capabilities and behavioral characteristics of successful digital leaders, providing strong support for model building. In the process of model construction, we follow the following principles and standards: First, the model should be comprehensive and cover the various abilities and qualities required by digital leaders; second, the model should be operable and can provide specific guidance for the cultivation and development of leaders; finally, the model should be dynamic and able to adapt to the changing needs of The Times and technological development.

### **3.2. Identification of capability elements**

Using a combination of interviews, questionnaires, and case studies, we have successfully identified the key competency elements of digital leadership. These elements include technology literacy, data-driven decision-making, innovative thinking and open mind, teamwork and communication skills. Technical literacy refers to leaders' ability to understand, master and apply emerging technologies. In the era of artificial intelligence, the technology is updated extremely fast, and leaders need to maintain learning and attention to new technologies in order to transform them into the competitiveness of organizations. Data-driven decision making refers to leverage data analysis and mining to guide organizational strategy development and day-to-day operations. Through data analysis, leaders can more accurately grasp market trends and customer needs to make more informed decisions. Innovative thinking and open mind refer to the innovative consciousness and the ability to accept new things. In the digital age, innovation is the key to the survival and development of an organization. Leaders need to encourage employees to develop new ideas and try new things to drive continuous innovation and development of the organization. Team work and communication skills refer to the collaboration spirit and communication skills shown by a leader in teamwork and cross-department collaboration. In the digital age, the boundaries of organizations are becoming increasingly blurred, and teamwork and cross-departmental collaboration have become particularly important. Leaders need to have good communication skills and teamwork skills to promote cooperation and coordination within the organization<sup>[5]</sup>.

## **4. Requirements and challenges of digital leadership in the era of artificial intelligence**

### **4.1. Requirements of the era of artificial Intelligence**

With the deepening development of AI technology, digital leadership is particularly critical both now and in the future. Leadership in this era is no longer solely dependent on traditional experience and intuition, but more dependent on data, technology and innovation. First, data-driven decisions have become the standard capability for modern leaders. In the context of big data, leaders need to be able to extract valuable information from massive amounts of data to provide decision support for the organization's strategy formulation, market positioning, product development, etc. This sensitivity to data and analytical ability is an important part of digital leadership. Secondly, innovative thinking ability has been raised to an unprecedented height in the era of artificial intelligence. In the face of a rapidly changing market environment and emerging new technologies, leaders need to have a forward-looking thinking, be able to foresee future trends and advance the layout. At the same time, they also need to encourage and support innovative activities within the team, and create an innovative culture that dares to try and is not afraid of failure. Moreover, interdisciplinary knowledge and global vision are also indispensable abilities of current leaders. As technology convergence and globalization processes accelerate, leaders need to have an interdisciplinary knowledge background to better understand and apply new technologies. In addition, they also need to have a global vision, can insight into the dynamics and development trends of the global market, to provide strategic guidance for the international development of the organization<sup>[6]</sup>.

### **4.2. Challenges faced**

While meeting the opportunities brought by the era of artificial intelligence, leaders also face many challenges. First, the speed of technology updates puts enormous pressure on leaders. Not only do they need to keep up with the technology, but they also need to predict the technology

trends and prepare for them. This puts forward high requirements on the leaders' learning ability and self-drive. Second, changes in teamwork methods also bring new challenges to leaders. In the digital age, team collaboration is more flexible and diverse, and remote collaboration and cross-department cooperation have become the norm. This requires that leaders to have excellent communication skills and teamwork skills, and that they are able to effectively coordinate and manage team members from different backgrounds and cultures. In addition, data security and privacy are also a focus for leaders. With the increasing number of data and the continuous progress of technology, how to ensure the security and privacy of data has become an urgent problem to be solved. Leaders need to develop and improve relevant policies and measures to ensure data security and compliance. To address these challenges, leaders need to adopt a range of strategies and measures. They need to keep learning new technologies and knowledge to remain competitive; focus on developing their communication and teamwork skills to adapt to changes in teamwork; focus on data security and privacy issues and develop relevant policies and measures to ensure data security and compliance. At the same time, they also need to pay attention to the construction of organizational culture and employee motivation issues to stimulate the creativity and enthusiasm of employees to promote the sustainable development and innovation of the organization.

## **5. Case study: Amazon's digital leadership**

In order to have a deeper understanding of the application and effectiveness of digital leadership in practice, we chose Amazon, the world's leading e-commerce and cloud computing giant, as the case study object. Amazon's success story is closely linked to its strong digital leadership, providing valuable lessons and lesson<sup>s[7]</sup>.

### **5.1. Amazon's Digital leadership practices**

Amazon's leaders are not only tech experts, but also strong believers in data-driven decisions. They know that the data is one of the most important assets of an organization in the digital age. As a result, Amazon extensively uses data for analysis and decision-making in various business areas. Data plays a central role, whether in understanding customer needs, optimizing product functions, or improving operational efficiency. In addition to data-driven decisions, Amazon leaders focus on innovative thinking and an open mind. They encourage employees to come up with novel ideas and to try innovative projects that can bring risks. This culture not only stimulates the creativity of employees, but also brings Amazon a continuous innovation and competitive advantage. It is worth mentioning that Amazon's recommendation system is an outstanding example of its digital leadership practices. The system is based on complex algorithms and a large amount of user data for analysis and recommendation, and can accurately predict the interests of users and provide personalized product recommendations. This not only increases sales, but also greatly enhances customer satisfaction and loyalty<sup>[8]</sup>.

### **5.2. Effectiveness analysis**

Amazon's digital leadership practices have not only achieved remarkable results in finance and market share, but also deeply influenced the entire business model and corporate culture<sup>[9]</sup>. From a financial perspective, Amazon has achieved steady growth for many years, thanks to its precise market positioning, efficient operation management, and continued technological innovation. The continued rise in market value reflects not only its recognition of Amazon's future potential, but also reflects its leadership position in the global business space. In terms of market share, Amazon not only dominates the global e-commerce field, but also, its cloud computing business AWS is



absolutely ahead of its competitors. This diversified business layout not only brings a stable revenue source for Amazon, but also provides a strong support for it in the fierce market competition. However, Amazon's success isn't limited to financial and market share growth. Its excellent customer service and continuous product innovation are the key to winning the trust and love of its users. Amazon always adheres to the concept of customer first, and meets the diversified needs of users by constantly optimizing the shopping process, improving the logistics speed and increasing the product categories. At the same time, Amazon also with its strong technical strength, constantly launch new products and services, leading the market trend. This deep customer relationship has brought steady repeat customers and word of mouth to Amazon. Users not only shop on the Amazon platform, but also are willing to recommend Amazon products and services to their friends and family. This word-of-mouth power further solidifies Amazon's position in the market, creating a virtuous circle. In addition, Amazon's digital leadership practices are also reflected in its shaping of its corporate culture. Amazon advocates an open, innovative, and collaborative corporate culture, encouraging employees to develop new ideas, experiment, and work together across departments. This cultural atmosphere not only stimulates the creativity and enthusiasm of employees, but also provides a continuous impetus for Amazon's continuous innovation and development.

### **5.3. Lessons and lessons learned**

**Data-driven decision:** In the digital age, leaders must master the ability to use data to analyze and make decisions. By collecting, integrating, and analyzing various data resources, leaders can more accurately understand market trends, customer needs, and business opportunities to make more informed decisions.

**Cultivating innovative thinking:** Innovation is the key driving force for promoting the sustainable development of the organization. Leaders need to create a culture that encourages innovation and tolerates failure, and stimulates their creative potential. At the same time, leaders themselves should keep an open mind and the spirit of continuous learning, and have the courage to try new ideas and technologies.

**Establishing efficient collaboration mechanisms:** In the digital age, teamwork and cross-department collaboration have become more important. Leaders need to focus on establishing good communication and collaboration mechanisms to promote information sharing and exchange of ideas among team members. By breaking down departmental barriers and promoting cross-departmental cooperation, we can accelerate innovation, improve work efficiency and enhance the overall competitiveness of the organization.

These lessons are important lessons for other organizations and leaders. By learning from the successful experience of Amazon, we can better understand and apply the digital leadership model to promote our own transformation and development.

## **6. Conclusions**

### **6.1. Main findings and contributions of the study**

Through systematic research and in-depth case analysis, this study finds that in the era of artificial intelligence, the core elements of digital leadership are data-driven decision-making and innovative thinking ability. Leaders need to actively respond to rapid technology updates and changes in teamwork styles, including continuous learning of new technologies, building efficient teamwork mechanisms, and developing cross-field collaboration capabilities. The successful practices of typical enterprises show that clear data strategies, innovative organizational culture, and strong teamwork capabilities are important factors in achieving digital leadership. The main

contribution of this study is put forward to adapt to the era of artificial intelligence digital leadership model, provides the leaders of self assessment and promotion, and through the case study reveals the successful elements and challenge strategies, provides a practical guide for other enterprises, and emphasizes the data-driven decision-making and innovative thinking ability in the era of artificial intelligence, pointed out the direction for the leader ability training.

## 6.2. Practical significance and value of digital leadership ability model in the era of artificial intelligence

Guiding leaders' capabilities: This model provides a clear roadmap for leaders to improve their capabilities, helping them systematically improve their abilities in data-driven decision-making, innovative thinking, and more.

Promoting the digital transformation of the organization: Leaders with digital leadership can better lead the digital transformation of the organization, and promote the innovation and optimization of the organization in the business model, operation process and other aspects.

Improving organizational competitiveness: In the era of artificial intelligence, the competitiveness of an organization depends largely on its level of digitalization. The digital leadership ability model helps the organization to cultivate leaders with digital ability, thus improving the overall competitiveness of the organization.

## 6.3. Outlook and suggestions for future research directions

Deepening the connotation research of digital leadership: With the continuous development of artificial intelligence technology, the connotation of digital leadership will be continuously enriched and deepened. Future research can further explore the new characteristics and new requirements of digital leadership in a new technological environment.

Research on the application of digital leadership: At present, the research on digital leadership mainly focuses on the enterprise field. In the future, it can be extended to government, education, medical care and other fields to explore the commonalities and differences of digital leadership in different fields.

Strengthening empirical research on digital leadership: In the future, the digital leadership ability model can be verified and improved through large sample empirical research, so as to improve its effectiveness and reliability in practical application. At the same time, the traps and misunderstandings in digital leadership practice can also be revealed through the analysis of failure cases.

Focus on the interactive relationship between digital leadership and organizational culture: organizational culture is one of the important factors affecting the practical effect of digital leadership. Future research could deeply explore the interaction between digital leadership and organizational culture and the mechanisms of their impact on organizational performance.

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