
The End of Management and the Paradigm Shift Driven by Digital Technology

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Abstract

While some management experts have predicted the end of bureaucratic control in management, organizations are currently experiencing unprecedented disruption due to the rapid advancement of digital technology. Traditional bureaucratic management, which relies on a top-down, command-and-control model, is no longer effective in a world where information is abundant and employees are empowered for innovation. This paper critically examines the evolution of control-based management practices from the historical evolution perspective and explores how digital technology has driven a paradigm shift, reducing the reliance on control and fostering the development of more flexible and decentralized management models. The findings suggest that managers should shift from control-based practices to liberating labor, empowering employees to innovate and collaborate. This paper bridges existing literature gaps and provides insights into how digital transformation requires organizations to adopt more flexible, innovative, and decentralized management structures.

Keywords: management paradigm; digital technology; control management; liberating labour

1. Introduction

Digitalization is transforming the workplace and human resources across various industry and service sectors (Da Silva et al.,2022; Rêgo et al.,2022; Strohmeier,2020; Thite,2022; Zhang & Chen,2023). But most management systems and principles are based on an outdated management paradigm (Grant,2008; Hamel & Breen,2007). In recent years, scholars have raised the question of ‘the end of management?’ or ‘management is out of date’, and have further explored the future development trends of management (Caglio & Ditillo,2008; Cloke & Goldsmith,2002; Ecker et al.,2013; Hamel & Breen,2007; Hewege,2012; McDonald,2011; Murray,2010; Raelin,2011; Styhre,2008; Uchitpe et al.,2015). Cloke and Goldsmith (2002) point out the rise of organizational values based on humanistic democratic value ideals, which will replace the depersonalized, mechanistic value system of bureaucracy. Some scholars point out that explored the movement away from bureaucratic forms of control toward the post-bureaucratic, normative forms of control (Styhre,2008). The former is based on detailed rules, routines, and scripts that guide day-to-day work, which can be considered as rational forms of control (Barley &

Kunda,1992). The latter relies on socialization, enculturation, and identification with company objectives, which are forms of subjectification processes (El-Sawad & Korczynski,2007; Ferrin et al.,2007). Caglio and Ditillo (2008) review and discuss different forms of management control in inter-firm relationships, such as market-based control and bureaucratic/hierarchical control. Therefore, it is evident that traditional management control methods are still widely used in practice.

However, management with bureaucratic control at its core has its limitations (Murray,2010; Raelin,2011; Styhre,2008), and it is dampening the motivation of managers in the current organizational environment. A survey report from BCG shows that 81% of managers say the job is harder than in recent years; 9% of managed employees aspire to become a manager in the next 5 to 10 years; 37% of managers think their management level will have disappeared within 5 years. These statistics indicate that change is imminent, and both employees and managers are longing for a new type of leadership and working methods. Then, previous studies have not fully considered the impact of technology on management. Digital technology is making it possible for organizations to operate in a more decentralized, agile, and collaborative way. However, outdated management thought or philosophy is further aggravating the tension of management and practice. At present, digital technologies such as artificial intelligence, blockchain, cloud computing, and big data (ABCD+) have become the dominant force in various economic fields, and the modern management science produced in the era of industrial shift can no longer adapt to the needs of new technological development. The ‘end’ and ‘paradigm shift’ of management is inevitably driven by digital technology, through a comprehensive innovation of organizational production methods to adapt and accelerate technological progress. Therefore, the ‘end’ and ‘paradigm shift’ of management are inevitable consequences of digital technology, which requires a comprehensive innovation of organizational production methods to adapt and accelerate technological progress.

2. The historical reviews of management

To gain a comprehensive understanding of the influence of digital technology on the ‘end of management’ and the direction of the paradigm shift, it is essential to delve into the historical development of management within firms (Spender,2015) and management thought. Since the technological advancements of the 1860s, our society has transitioned from traditional handicrafts to the era of steam engines, mechanization, electrification, automation, and presently, the era of information intelligence. Throughout this progression, the mode of production within firms has undergone significant transformations, leading to an increased level of human autonomy and a shift from predominantly manual labor to predominantly intellectual labor (Wren, 2005).

2.1 The early origins of management

Prior to the Industrial Revolution, work was primarily carried out in homes and on farms, either by forced labor (slaves or indentured servants) or by family members. The output produced during this time was often consumed by employers, local communities, or families. The

emergence of management as a profession can be directly attributed to the expansion of slavery (Uddin & Hossain,2015). As slave plantations and empires grew, and captives were forced into military service or domestic labor, the importance of management also increased. The use of managers in work settings can be traced back to the first Babylonian dynasty and was even mentioned in the Code of Hammurabi (Cloke & Goldsmith,2002). At its core, management is inseparable from control, coercion, and the unequal distribution of productivity and skills resulting from ownership and power dynamics.

As slavery transitioned into serfdom, enslaved individuals were granted some degree of freedom to control their own labor. However, during this period, serfs were legally prohibited from leaving their place of employment. With the advent of feudal society, skilled craftsmen and feudal merchants initially did not require loyal managers. However, as production expanded, the need for management, coordination, and supervision grew (Wren & Bedeian,2008). Although it can be argued that ‘for every ounce of freedom gained, we subject ourselves to yet another form of control’ (Raelin,2011), the historical trend indicates that the various forms of control exerted by organizations over workers have weakened with the advancement of production technology.

2.2 The industrial shift and management

Despite its ancient origins, modern management is a relatively young discipline, with less than 150 years of history. The Industrial Revolution, which was fuelled by the rise of British power, marked a significant advancement in management practices. Adam Smith, in his influential work ‘The Wealth of Nations,’ introduced the concept of specialization and coordination within corporations as drivers of economic growth. The advent of the steam engine further revolutionized production and transportation, leading to reduced costs and expanded market reach. The period between 1760 and 1900, known as the Industrial Revolution, witnessed the birth of the modern corporation. These corporations, typically operating in factory settings, relied on specialized and coordinated work overseen by managers (Uddin & Hossain,2015). However, this transformative shift also brought about various challenges, similar to those we face today in transitioning from a manufacturing to an information-based economy.

One such challenge was how to motivate workers. In the past, when labor was controlled by families, motivation was relatively straightforward, as the survival of the family depended on everyone's contribution. However, in the factory setting, workers had the ability to shirk their responsibilities or even sabotage machinery if they disagreed with management's decisions (Wren & Bedeian,2008). These issues, along with managerial inefficiencies, prompted engineering reformers to advocate for the establishment of management as a distinct field of study. The aim was to bring order and logic to work processes. Despite the significant technological advancements during this period, management practices still lagged behind (Wren, 2005).

2.2.1 Taylor and Scientific Management

The second phase of the Industrial Shift began with the establishment of management as a distinct field of knowledge. It is worth noting that management's origins can be traced back to the United States, rather than Great Britain (Wren & Bedeian,2008). According to Peter Drucker, a renowned management consultant and educator, the development of management was one of the United States' significant contributions to the world, alongside the Declaration of Independence. Concurrently, sociology and psychology were also progressing, while history and economics were becoming more scientific and formal. This pivotal development can be attributed to Frederick Winslow Taylor, often referred to as the father of scientific management. Taylor's pioneering work in scientific management involved integrating ideas and philosophies from various sources, including Charles Babbage (1791–1871), an Englishman from the 18th century. Taylor's approach involved reconstructing jobs using the most efficient methods and training workers accordingly. Additionally, by incorporating rest periods throughout the workday, he was able to increase productivity without exhausting the workers (Taylor,1911). Another significant contribution of Taylor to the field of management was the concept of first-class work. He believed that workers should strive to perform to the best of their physical and mental capabilities. Those who were unable to meet the production and job demands were reassigned to areas where they could contribute most effectively. First-class work was not solely based on physical exertion or sporadic bursts of activity, but rather on what workers could realistically achieve. Based on these management principles, managers should establish scientific rules for each aspect of a job. For instance, early managers held the belief that allowing workers to take breaks would limit productivity. After all, how could a worker produce if they were not working? Taylor challenged this mindset through research that demonstrated the benefits of incorporating breaks into the workday. As a result of Taylor's findings, we now enjoy the practice of coffee breaks.

2.2.2 Henri Fayol and General Management

Fayol introduced three fundamental concepts in management. Firstly, he emphasized the importance of unity of command, which means that a company's management should have a singular voice. Secondly, Fayol recognized that workers not only focused on the monetary compensation they received, but also on the social aspects of their jobs. Lastly, Fayol placed great emphasis on justice within an organization, advocating for fair and equitable decision-making processes. Collectively, these ideas became known as Fayolism or administrative theory. Fayolism consists of the 14 principles of management. In addition to these principles, Fayol identified the five functions of management: planning, organizing, staffing, controlling, and directing. Each of these functions delineates the daily responsibilities of managers. While the functions of management have evolved over time, they have built upon Fayol's foundational structure. Fayol comprehensively described the role of a manager and how each activity is interconnected. However, Mintzberg argues that Fayol's five elements of management are tautological, implying excessive control. Mintzberg believes that the essence of management lies in fostering respect, equality, trust, cooperation, and sharing, rather than manipulating or controlling individuals like machines or sheep (Mintzberg,2007).

2.2.3 Max Weber and Bureaucratic Management

Max Weber, a German sociologist, made significant contributions to Taylor's management system, economics, and sociology. One of Weber's most notable contributions to modern management was the development of the modern bureaucracy, which emphasized decision-making based on rules rather than personal preferences. Weber's work laid the foundation for organizational design and highlighted the importance of authority. Prior to Weber, managers were not required to justify their decisions or adhere to rules. Hiring and promotions were often based on nepotism, in stark contrast to the meritocracy of today. Reed (1992) argued that the rise of bureaucracy demonstrated the cognitive power and technical superiority of an internal organizational logic, which resolved the inherent conflict between traditional values and beliefs. Kallinikos (2003) further explained that the emergence of bureaucratic organizations was rooted in a significant anthropological innovation, representing a new way of conceptualizing humanity and institutionalizing it.

2.3 Human relations movement (Behavior science)

The human relations movement emerged as a natural response to the issues associated with scientific management and its neglect of the social aspects of work. Taylor, Weber, and Fayol, who were key figures in this movement, emphasized efficiency through operational, legal, or administrative improvements. A fundamental assumption was the importance of rationality, where actions were driven by logic and formal and knowledge authority served as the primary drivers of workplace motivation. However, scientific management tended to overlook the impact of social pressures on human interactions. The human relations movement complemented scientific management by recognizing that attitudes, perceptions, and desires of individuals influence their performance in the workplace.

The Hawthorne studies, conducted by Elton Mayo (1880-1949), are widely regarded as the most influential but also misunderstood and criticized research experiments. Mayo observed that productivity could be increased by understanding individual workers' attitudes towards work and considering the influence of group attitudes on behavior (Wren,2005).. However, these criticisms fail to acknowledge two significant facts about the Hawthorne studies. Firstly, these studies marked a notable shift in sociological research as they focused on the actual work life of employees. Secondly, their purpose was to generate future research, and subsequent studies have indeed revealed the critical role of attitudes in determining workplace outcomes.

2.4 Modern management

The modern management system has addressed behavioral issues by promoting flexibility, informality in worker-manager relationships, collaboration, employee reflection, and creativity (Uddin & Hossain,2015; Waddell et al.,2013). From the 1970s onwards, we have witnessed the intertwining of various management schools of thought. One prominent approach in modern management is the development of managerial theories. Since the 1970s, the concept of theory has permeated the management literature, leading to more rigorous research (Sutton & Staw,1995) and giving rise to the phenomenon of the management theory jungle (Koontz,1961;

Koontz,1980). The body of knowledge explored in modern management, encompassing concepts such as strategy, organizational behavior, human resource management, and organizational theory, has deep roots dating back to the 1970s. In addition, the concept of New Managerialism, also known as new public management, emerged during the Thatcher and Reagan years (Davies,2003). It is worth noting that people-centered management discourses seem to be lacking within the new managerialist discourse of market supremacy, entrepreneurialism, efficiency, and cost-cutting (Thompson,2017).

The history of management must consider specific aspects that distinguish today's management from the past, such as scale, technology, and globalization (Spender,2015). Simultaneously, European and American enterprises have encountered significant changes in the organizational environment over the past 50 years. Firstly, there has been remarkable progress in technology, particularly in the realm of computers and the Internet. For instance, the emergence of Generative AI has garnered substantial executive support, clearly defined business outcomes, and rapid adoption. Secondly, globalization (Roehling et al.,2005) and the outsourcing of manufacturing production (which was the primary focus of scientific management) have become prevailing trends in developed countries. Thirdly, management innovation, rather than operational, product, or strategic innovation, is touted as the 'ultimate competitive advantage' (Grant,2008), with increasing attention being paid to employee innovation. Motivating employees to innovate has thus become the primary focus of management research (Zhao et al., 2022).

2.5 Brief summary

Taylor revolutionized management practices and played a pivotal role in shaping the modern management world. Although subsequent researchers did not replace Taylor, they did complement his work. What is truly impressive about Taylor is not that he was correct for his time and context, but that his vision continues to hold significance and relevance even in today's world.

Fayol's ideas form the foundation of modern strategy as he sought to comprehend the essential tasks that managers should undertake. His concepts provide valuable insights into the various roles that managers must fulfill in order to ensure worker cooperation. Similarly, Weber's ideas are prominently reflected in contemporary human resource management, emphasizing the importance of decision-making based on policy rather than personal whim. The enduring influence of both men's ideas on organizational structure and the chain of command is evident in present-day management practices.

Following the Hawthorne studies, the field of management has witnessed a significant shift towards embracing a new concept of organizational values rooted in humanistic democratic ideals (Cloke & Goldsmith,2002; Raelin,2011). This departure from the depersonalized and mechanistic value system of bureaucracy, which characterizes most management systems and principles, is a major trend in management development. Elton Mayo and his colleagues pioneered the field of organizational behavior, and their work continues to impact areas such as

motivation, stress, and job design. ‘Throughout most of history and much of theory, management has been focused on controlling rather than freeing labor’(Cloke & Goldsmith,2002). However, with the changing dynamics of economics and morality over the centuries, laborers now have the freedom to choose where and for whom they work. Consequently, these transformations have led to significant changes in the utilization of labor and other resources in production.

3. Management challenges under digital technology

In many organizations, technology changes have led to radical resource redeployment in what managers do (Roehling et al.,2005; Stone et al.,2015; Strohmeier,2020). Technique is not amoral when its very nature drives organizations to a certain type of morality (Mintzberg,2007). The development of digital technology is driving industrial digital innovation and permeating every aspect of the innovation process. Specifically, the impact of digital technology on organizational innovation is characterized by borderlessness, self-organization, programmability, and decentralization. With data as the key element of ABCD+ technology innovation, organizational innovation has transitioned from a fuzzy logic based on the application of fuzzy set reasoning to a precise logic that is data-driven and quantifiable. In this process, a large number of innovation subjects continuously interact with each other across domains, boundaries, and decentralization, based on the expansion of technology depth and breadth. Looking towards 2035, the workforce represented by Generation Z will grow under the influence of digital technology and drive the development of digital technology and organizational innovation.

3.1 Impact of digital technology

Digital technologies—artificial intelligence (AI), blockchain, cloud computing, and big data—are reshaping organizational paradigms, driving innovation, and challenging traditional management frameworks. AI introduces transformative human-machine collaboration, redefining managerial roles as ‘artificially intelligent employees’ (Pereira et al., 2023). Generative AI’s pervasive integration (‘AI Everywhere’) demands adaptive management theories¹, as traditional tools designed for the ‘social human era’ lose relevance (Raisch & Krakowski, 2021). While AI enhances decision-making through deep learning, it intensifies tensions between efficiency and ethics, necessitating vigilance over its ‘double-edged’ effects (Pereira et al.,2023; Raisch & Krakowski,2021). Blockchain’s decentralized architecture enables distributed autonomous organizations (DAOs) (Ecker et al.,2013), replacing hierarchical structures with smart contracts and token incentives (Casino et al., 2019). Unlike traditional control-based systems (Puthal et al.,2018), DAOs operate via predefined rules, achieving self-governance and value optimization (Lu,2018). This shift resolves historical limitations of democratic self-management models (Cloke & Goldsmith, 2002; Stone et al.,2015), offering technical foundations for management paradigm shifts (Casino et al.,2019). Cloud computing democratizes access to advanced IT infrastructure, empowering SMEs through public and market cloud services (e.g., Alibaba, Huawei) (Bildosola et al.,2015; Liu et al.,2018). By reducing system complexity and costs, it accelerates platform ecosystem development and organizational agility (Berriman et al.,2010). However, rapid cloud adoption heightens digital transformation

¹ <https://www.idc.com/events/futurescape>

barriers and inter-firm competition. Big data's volume, variety, and velocity challenge traditional data processing, yet its analytical potential drives innovation (Niegel et al., 2019). It transforms strategic decision-making by integrating multidisciplinary insights (e.g., HR analytics combining psychology and economics) (Thite, 2022) and supports objective decision frameworks for operations and innovation (Chae, 2019; de Camargo Fiorini et al.,2018).

3.2 Change of organizational environment

Over the past decade, the organizational environment has undergone significant changes (Andrews & Johansen,2012; Cascio & Montealegre,2016; Yoo et al.,2012) due to the advancements in digital technology, particularly represented by ABCD+. As a result, organizational structures have become increasingly flatter, and there is a growing emphasis on intrinsic motivation for individual employees. One example of this is the adoption of management innovation tools like OKR (Niven & Lamorte,2016), which effectively cater to the evolving needs of both internal and external environments in internet software companies. These tools contribute to enhancing individual efficiency and organizational effectiveness. In the realm of management practice, there has been a continuous focus on leadership styles, often distinguishing between 'leaders' and 'followers', or 'managers' and 'subordinates'. However, one implicit assumption that has been challenged is the belief that leaders are always more intelligent than their subordinates. In reality, employees often possess better judgment and execution skills than their leaders (Raelin,2011). The implementation of a flat organizational model aims to facilitate quick communication and information transfer, simplify feedback channels, and maximize the initiative and motivation of frontline employees. Consequently, there is a growing demand for 'organizational democracy' among employees, as they seek to be treated as equals rather than being solely managed.

3.3 Future workforce

Generation Z, born between 1995 and 2010, is commonly referred to as the Internet Generation or 'digital natives' (Seemiller & Grace,2017; Turner,2015). This generation has been greatly influenced by technologies such as the Internet, smartphones, and tablets. With the continuous development and application of ABCD+ technologies, Generation Z is gradually becoming the dominant workforce², expected to take center stage by 2035. According to a report by IDC, the future workforce will be characterized by human-machine collaboration, where work is accomplished through the joint efforts of human workers and digital counterparts. In the process of digital transformation, millennials and Generation Z will make up 75% of the global workforce. They will lead a completely digital way of working and greatly influence the technology choices made by enterprises, thereby shaping new work and business models. With the emergence of third-platform digital technologies (e.g., AI, AR/VR, and IoT), employees will be better equipped to perform structured, predictable, and repeatable computing tasks. Furthermore, the advancement of robots and artificial intelligence (AI) is revolutionizing the traditional manufacturing production pattern, gradually replacing simple labor.

² <https://www.catalyst.org/research/gen-z-future-workforce/>

4. The end of management

4.1 The trend of control management

For a significant period of time in the past, management regarded workers merely as a tool or a machine (Uddin & Hossain,2015). Mary Parker Follett (1868–1933) advocated for the principle of coordination, emphasizing the importance of continuous interaction among all factors. Her argument was that both management and workers should be able to understand each other's perspectives. She aimed to establish a power-sharing relationship between management and workers, rather than one where either party held power over the other (Wren,2005). Furthermore, prior to the emergence of capitalism, management theory primarily focused on political management, with relatively little consideration given to business management (Spender,2015). During the early years of the Industrial Shift, workers had little control over their own labor and experienced only marginal improvements compared to earlier slaves and serfs (Wren,2005). Consequently, a significant workers' movement arose in the late 19th and early 20th centuries, leading to a new role for business managers as substitutes for workers and strike breakers (Cloke & Goldsmith,2002).

In this context, Taylor's scientific management approach achieved great success. It provided employers with a means to undermine the power of skilled, organized labor while simultaneously reducing the labor intensity of workers and increasing productivity. Taylor's management ideas are outlined in his work, 'The Principles of Scientific Management,' which focused on time and motivation to maximize efficiency by eliminating unnecessary or repetitive steps and reducing what he perceived as laziness and redundant labor (Wren & Bedeian,2008). During this time, managers were primarily engineers, and Taylor explicitly stated that skilled employees should not be involved in decision-making processes or have control over the work process. According to the Taylor model, managers are responsible for all the thinking, planning, and directing, while workers are expected to carry out their tasks in a predetermined manner. Due to the implementation of machinery, equipment, assembly lines, and other management models, workers during this period experienced increased freedom and job security compared to early craftsmen, resulting in significant improvements in productivity. A notable management practice during the scientific management era was Ford's 'assembly line,' which emerged in a specific time frame (1908-1913), in a specific location (Detroit), and within a specific industry (the automobile industry) (Nye.,2013). Rather than being solely an industrial technology, the assembly line was the outcome of a fusion between industrial management, specifically scientific management principles, and early industrial technology.

Traditional management founded within the industrial age paradigm has reached the limits of its relevance (Hamel & Breen,2007; McDonald,2011). The 'end' of scientific management does not signify the complete eradication of its management ideas, but rather their evolutionary development. The era of social man, which was initiated by the Hawthorne studies, began to emphasize the psychology and behavior of workers, leading to a gradual shift in human factors within the workplace. In contrast to the traditional organizational Theory X, Douglas McGregor introduced a new management paradigm, Theory Y, which posits that employees require

meaningful work and possess an inherent pride in their tasks (Wren,2005). With the emergence of technologies such as automation and computerization, the concept of ‘knowledge workers’ began to gain prominence, and networked organizations built upon self-managed teams started to attract widespread attention. Throughout the 20th century, the power and authority of management steadily declined, and this trend is now accelerating (Cloke & Goldsmith,2002). However, it is undeniable that, for much of the time and across most theories, the focus of management has primarily been on exerting control over labor rather than freeing it. Therefore, we believe that the essence of management is not to control labor; rather, management is a responsibility that entails not only improving efficiency, creating performance, and promoting sustainable organizational development, but also fostering the mutual growth of organizational members and relevant stakeholders. In terms of management, we can summarize it as the development, application, and integration of pertinent resources both within and outside the organization. This is achieved through the implementation of corresponding systems, technologies, processes, and methods, all of which are aligned with the organizational culture and strategy. Ultimately, this promotes the enhancement of competitiveness and the overall common development of the organization and its members.

Consequently, from a historical perspective, the level of control managers exert over workers is diminishing, while the autonomy of workers is gradually increasing. As other scholars suggested, corporate bureaucracy (Murray, 2010) or managerial control (Raelin,2011) is becoming outdated.

4.2 Digital technology and management

One widely criticized aspect is hierarchical bureaucracy. While the hierarchical structure facilitates the transmission and execution of top-down instructions, its advantages in accuracy, timeliness, and efficiency were well-suited to the needs of a market economy and industrial mass production. Nevertheless, with the advent of computer and Internet technologies towards the end of the 20th century and the intensification of global corporate competition, hierarchical organizations faced notable challenges in bottom-up information collection, processing, and interpretation. Digital technologies have exacerbated these challenges by enabling faster information dissemination and decentralized decision-making—for instance, real-time communication tools (e.g., Microsoft Teams) allow cross-functional teams to collaborate directly, reducing reliance on middle management and flattening organizational hierarchies (Lu, 2024).

The utilization of digital technology has significantly bolstered labor productivity across society. The macro determinants of total factor productivity primarily encompass human capital or knowledge reserves, research and development (R&D) expenditure, information and communication technology (ICT), and institutional factors (Ahmed & Bhatti,2020). Different ICT software applications have a positive and substantial impact on labor productivity in EU countries, with a greater influence on transitional economies (Relich,2017). R&D and ICT jointly influence productivity, and in the context of digital transformation, human capital and

digital technology are closely intertwined—this synergy enhances labor productivity and accelerates organizational digital transformation (Pieri et al., 2018). For example, AI-driven startups (e.g., Revolut in banking, Tesla in automotive) leverage digital tools to upskill employees in data analytics and algorithmic thinking, resulting in 40% faster innovation cycles compared to traditional firms that limit digital training to operational roles (Figura et al., 2025). When it comes to specific applications of digital technology, several aspects are noteworthy:

AI technology reshapes human-machine collaboration, fostering a work environment where humans and technology co-create value. This mode revolutionizes industrial production—for instance, AI-powered predictive maintenance in manufacturing reduces downtime by 30% (Freire De Souza et al., 2024). However, unlike traditional firms that use AI for basic automation (e.g., H&M’s inventory tracking), AI-driven startups integrate AI into core business models (e.g., Zalando’s algorithmic fashion recommendations) to enable employee empowerment and customer co-creation (Figura et al., 2025).

Blockchain technology makes decentralized organizations a reality, with smart contracts providing technical support for management innovation. For example, blockchain-based supply chain management in the automotive industry (e.g., Tesla) eliminates information asymmetry between suppliers and manufacturers, enabling self-governance without hierarchical oversight (Figura et al., 2025). Additionally, blockchain enhances ESG performance by ensuring transparent reporting of sustainability metrics, a critical factor for investor trust post-COVID-19 (Wang et al., 2025).

Cloud computing technology expands the boundaries of platform organizations, empowering operations and enhancing efficiency. SMEs, in particular, benefit from cloud-based ERP systems to streamline processes—for instance, Italian fintech startups use cloud services to scale their digital banking solutions without investing in physical infrastructure (Buonocore et al., 2024).

Big data technology drives organizational digital transformation by optimizing knowledge, technology, and processes. For example, big data analytics in retail (e.g., Zalando’s customer behavior analysis) enables personalized marketing, improving customer retention by 15% (Figura et al., 2025). Moreover, the integration of big data with other technologies (e.g., IoT in logistics) continuously optimizes business processes, boosting total factor productivity (Lu, 2024).

The emergence of digital technology has given rise to digital management, which in turn influences the application and development of digital technology. The process of enterprise digital transformation involves shifting from the traditional ‘industrial management model’ to the ‘digital management model’—this includes integrating digital technology into existing frameworks, restructuring information systems, and changing management mindsets (Lu, 2024). For instance, responsible innovation leadership—characterized by continuous learning, stakeholder engagement, and ethical sandboxes—has enabled firms to balance digital transformation with social impact (Buonocore et al., 2024). This mindset shift drives disruptive innovations in management paradigms and further advances digital technology adoption.

Digital transformation has a profound impact on organizations, not only changing their core business models through the usage of digital technology, but also revolutionizing their management models and concepts. Therefore, in the pursuit of digital transformation, attention should be given to both the technical aspects of digital technology application and the conceptual aspects of digital management innovation.

4.3 The end of management

In the 21st century, it is necessary to replace dehumanized, mechanistic, and counterproductive authoritarian management (Cloeke & Goldsmith,2002; Hewege,2012; Raelin,2011). The development of new technologies, such as computers and the Internet, has greatly improved productivity and had a profound impact on traditional organizational management. For instance, the hierarchical organizational structure has hindered the enhancement of organizational efficiency in terms of information collection, processing, and interpretation from bottom to top. As Ouchi pointed out, ‘the forms of control that dominate today may not be suitable for future organizations’ (Ouchi,1979). In situations of ambiguity, loose coupling, and uncertainty, it is impossible to achieve reliable and precise measurements. A control system based on such measurements, as seen in bureaucratic management (Raelin,2011), is likely to systematically reward a narrow range of maladaptive behavior, ultimately leading to organizational decline. As one Texas Instruments executive stated regarding their systems, ‘We made ‘em bureaucratic. We used the system as a tool for control rather than facilitation. That’s the difference.’ (Mintzberg et al.,1998). While ‘soft’ alternatives, such as empowerment and post-bureaucratic options, are not expected to completely replace control in organizing (Raelin,2011), they do complement the scientific management approach by incorporating the human factor and their contributions within an organization (Uddin & Hossain,2015). In contrast, Cloeke and Goldsmith (2002) proposed a series of radical organizational development plans to eliminate authoritarian and paternalistic management and promote the development of new ‘organizational democracy’ within organizations. The decline of the control function can lead to a more critical set of managerial roles (Fisher,1999).

Since around 2011, especially following the global financial crisis in 2008, digital technologies represented by ABCD+ have made significant advancements. Decentralized organizations and platform organizations have emerged, and flat and networked organizational structures have become prevalent. Bureaucratic management, which is characterized by ‘controlling labor,’ has increasingly struggled to unleash the innovative potential of talents and effectively respond to the management challenges of the digital technology era.

The concept of ‘control’ in organizational theory primarily focuses on control mechanisms within hierarchical systems and guides the management practices of modern enterprises. In reality, ‘controlling’ labor and ‘freeing’ labor represent two different perspectives on management concepts, both of which offer interrelated interpretations of the same phenomenon. Any management innovation is influenced by various social and historical factors, such as technological advancement, economic development, cultural norms, and political climate. The transition away from ‘control’ management within hierarchical systems is essentially a

transformation of the economic and social development model, driven by the advancement of digital technology. The management paradigm characterized by ‘controlling labor’ and impeding innovation is gradually being phased out. However, this process does not occur overnight, but rather unfolds gradually over time, dictated by the pace of technological progress. While labor is liberated in terms of personal freedom, the activity of workers may still be indirectly influenced by the control management concept within hierarchical systems. For instance, the use of digital technology to monitor employees and consumers may increasingly impede the efficient functioning of organizations.

5 The future paradigm of management

In 2002, a book titled ‘*The end of management and the rise of organizational democracy*,’ in which they proposed the need for a new framework and rules for organizations in the business community. The goal was to produce high-quality, competitive products that meet customer needs while also considering environmental sustainability and human well-being. Although technological limitations at the time hindered the emergence of new organizational forms, the authors put forth radical plans for organizational development to replace authoritarian and paternalistic management with a new concept of ‘organizational democracy.’ The transformative nature of collaboration, self-management, and organizational democracy, highlighting the importance of flexible, value-driven policies, responsiveness to customer needs, and utilizing conflict as an opportunity for progress and learning.

Management innovation, particularly in human resource management, is directly influenced by science and technology. The advent of the new generation of digital technology, represented by ABCD+, holds immense potential for reducing physical labor and promoting human liberation. However, it is crucial to acknowledge that while developed technology facilitates labor liberation and serves as a prerequisite for it, it is not the sole or sufficient condition. In the face of digital technology's impact, management innovation through a paradigm shift can effectively free labor and counterbalance the development of digital technology. Consequently, the future workforce will witness a collaboration between humans and technology, as humans work alongside machines to accomplish complex tasks. This mode of human-machine collaboration will become the norm under the wave of digital technology. In this context, the paradigm shift of management can only adapt to the development of digital technology and re-establish a new management paradigm that adapts to digital technology.

5.1 Management adapted to digital technology

Digital technology innovation is a collaborative process that involves networked and decentralized innovation. It is primarily driven by technology convergence and changes in technological systems. One prominent example of digital technology is ABCD+ technology, which breaks down internal and external organizational boundaries. This empowers enterprises to develop across borders and create more value-added services for users in terms of both time and space dimensions. However, it is important to acknowledge that organizational models are always accompanied by changes in technology, economy, politics, and culture. The shift in

management paradigm should primarily focus on adapting to the trend of digital technological change. At the theoretical level, new phenomena such as flexible organizations, the intelligent era, integration of industries, digital value creation, three-table structure, information force, and service logic are emerging. At the practical level, digitalization, networking, and intelligence are intertwined and integrated with the development of the Internet, Internet of Things, universal network, and the digital transformation of enterprises. The development of digital technologies has fundamentally changed the nature of objects, their expansion, and the data they generate. This, in turn, redefines user value, competitive models, and competitive boundaries (Porter & Heppelmann,2014). Under these conditions, the clan form of control, which emphasizes values and objectives as much as behavior, may be preferable (Ouchi,1979). However, unobtrusive control needs to be grounded in a coherent theoretical framework (Perrow,1986). Therefore, the paradigm shift in management must also adapt to changes in the management object, including forms of human-computer collaboration, among others.

5.2 Adapting management thinking to digital technology shift

The role of information technology in the process of digital transformation is evident to everyone. Technological empowerment plays a crucial role, but the key to successful transformation lies in a conceptually driven approach, specifically the paradigm shift in management that focuses on freeing labor. Digitalization is manifested at various levels, with the technical and systemic levels being the most observable application layer. However, the most profound transformation occurs at the conceptual and cultural levels, which can be seen as the deepest 'cognitive code'. Therefore, when companies discuss digital transformation, their first priority is often to build and launch new technologies, systems, and platforms. Unfortunately, this approach sometimes leads to a deadlock.

5.2.1 New management thinking

Literature discussing management control in relation to innovation highlights the competing demands that these two phenomena create within organizations (Lövstål & Jontoft,2017). In the face of changing organizational environments, there is a need for new management thinking (Raelin,2011). As industrial technology advances, the emphasis is placed on the functions of planning, organizing, directing, coordinating, and control. Among these functions, 'control' plays a crucial role in organizational management practices. In the realm of human resource management, 'controlling labor' is evident in various aspects of daily management activities. However, with the development of digital technology, the rise of knowledge workers, the demand for labor rights, and the desire for organizational innovation, it has become challenging for management to liberate labor and stimulate employees' innovative behavior while adhering to a control-oriented mindset.

Performance management lies at the core of human resource management, and the paradigm shift necessitates breaking through the traditional notions of performance management. This includes updating the concept of 'performance,' revising the traditional view that performance appraisal is solely for lower-level employees rather than upper-level ones, reassessing the

objectives of performance appraisal, and making performance management the norm in the workplace. The concept of the main body of performance appraisal or performance management, as well as its operational mechanism, must be further updated to emphasize the need for vertical and horizontal integration in performance management.

5.2.2 Self-organization and democracy

Self-managed teams are built on emotional relationships and personal connections between individuals (Stone et al.,2015). They do not require blind obedience, but instead reach consensus and direction through dialogue and negotiation. In self-organization, the team does not follow the will of a leader like a child following the orders of a surrogate parent. Each member takes responsibility and acts like an adult (Cloeke & Goldsmith,2002). Therefore, self-organization does not rely on hierarchical status. Self-managed teams are based on the self-control of all team members, who are truly equal and achieve genuine freedom through 'self-management'. The core principle of self-organization lies in freeing labor, and the members of the organization are not as competitive as those in a hierarchical organization. They cooperate with each other through constant communication, actively listen to one another, and continuously correct their own mistakes. Thus, the paradigm shift in management needs to emphasize organizational democracy in order to free labor.

5.2.3 Agile organization

Dynamic and flexible organizational boundaries facilitate the integration of internal resources and enable better adaptation to changes in the external environment (Liu et al.,2018; Santos & Eisenhardt,2005). At the beginning of the 21st century, startups and internet companies introduced the 'agile model.' In this model, teams are multidisciplinary and enjoy greater autonomy, with managers serving as the main guarantors of collaboration and autonomy. A warm and trusting relationship is established between managers and their teams. The agile model aligns with the demands of digital technology development, thus the management paradigm shift must cater to the needs of the agile model while continuously liberating labor.

5.3 *More attention to the 'humanity'*

The assumption of human nature serves as the foundation for cognitive and practical management activities. Over the course of human resource management model development, the understanding of human nature has evolved, leading to the transformation from mechanization to humanization and automation. As the economy and technology continue to advance, the assumptions of 'economic man,' 'social man,' and 'self-achieved man' have deepened our comprehension of human behavior. The concept of the 'complex human' has taken this understanding to a more advanced level. Succeeding in a digital world is not an easy task and cannot be accomplished solely by adopting new technologies or replacing humans with technology, as some may fear. In an era driven by technology, true leaders will prioritize people and focus on humanity rather than material possessions or technology.

Under the traditional work manufacturing production mode, managers primarily focus on material possessions and the efficient operation of assembly lines. All personnel are required to serve the production needs of the assembly line. For instance, Lenovo's target management is more oriented towards hardware manufacturing, which aligns with the company's development stage and goals. Many of our companies still operate in the all-encompassing manufacturing industry, including hardware manufacturing for the Internet. On the other hand, software services represent a typical knowledge-based service industry that relies on the expertise of employees to generate revenue. In this case, management places greater emphasis on humanity. It is evident that 'human resources' are the core element that can bring the most value to an enterprise in terms of organizational management. Therefore, the fundamental direction of a paradigm shift is to prioritize and liberate labor by placing more emphasis on humanity itself.

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5 Discussion

Through the integration of change, enterprises can achieve digital transformation and implement management innovation that is compatible with it. The core of human-machine collaboration management will increasingly focus on 'humanity' itself, including digital management (e.g., telecommuting and work from home), self-organizational management (e.g., OKR), and human-machine collaboration (e.g., Generative AI). This represents a significant departure from previous management changes. The emphasis is now on a human-centered concept, where digital management, self-organizational management, and human-machine collaboration give more importance to the role of humanity. In future management innovation, there needs to be a greater emphasis on the development of intelligent digital technology. Organizations must seize the opportunity to integrate technology with traditional culture and fully leverage the value of 'humanity'. According to Accenture Technology Forecast 2016, excellence in the future will not only be measured by the number of advanced technologies mastered, but also by the motivation of people to create more results with technology. While digital technology is at the core of the productivity shift, it is people who will be at the heart of future business transformation.

In a highly competitive business environment and an increasingly digital world, the key to future management innovation lies in capturing the digital culture and 'humanity' that are compatible. This will be the crucial path forward and a focal point for leading the paradigm shift in management. The new management paradigm carries various implications for organizations.

Firstly, organizations must cultivate greater agility and adaptability to swiftly respond to environmental changes. Secondly, organizations must foster innovation to generate novel ideas and products that can compete in the global market. Lastly, organizations must embrace a heightened sense of ethics, utilizing technology responsibly and ethically.

6 Conclusion

Any management innovation is contingent upon specific socio-historical conditions, encompassing the levels of technological, economic, cultural, and political development. Consequently, the operational efficiency of a given organizational model varies across different historical periods, developmental stages, and countries or regions. At the dawn of the 20th century, the hierarchical organization, stemming from scientific management theory, exhibited high mobilization capacity and efficiency. However, as societal development progressed, its limitations gradually surfaced. The fundamental impetus behind economic transformation lies in technological advancements, and the advent of the internet in the early 21st century enabled the establishment of network-based organizations centered around self-managed teams. Around 2011, the ascent of digital technology, typified by ABCD+, facilitated the emergence of borderless, self-organizing, programmable, and decentralized organizations. Nevertheless, management approaches focused on 'labor control' have encountered increasing difficulties in addressing the management challenges of the digital age.

The notion of the end of managerial control can indeed pose a threat to management (Raelin,2011). The end of management signifies a fundamental change in economic and social development within the context of digital technology. The outdated management approach of 'controlling labor' and stifling innovation is gradually being phased out. In light of the development of management and technological advancements, the paradigm shift in management lies in the 'freeing labor' through the utilization of digital technology. This can be achieved by strengthening the integration of digital technology and management, adapting management thinking to align with the requirements of digital transformation, and placing a greater emphasis on the 'humanity' approaches.

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