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THE EVOLUTION OF LEADERSHIP STYLES DURING THE INDUSTRIAL DEVELOPMENT OF SOCIETY

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Purpose: The work aims to consider the evolution of leadership styles in the context of industrial development. The research aims to study changes in leadership approaches at different stages of industry development, such as industry 1.0, 2.0, 3.0, and 4.0, identify the characteristics of each stage, and discover how these changes have affected leadership approaches. Particular attention is paid to identifying factors that determine the evolution of leadership styles, mainly changes in the technological, economic, and socio-cultural environment, to understand how these factors influence the development of leadership approaches and how this is reflected in organizational strategies.
Design/methodology/approach: The article analyzes scientific literature and studies historical data and events devoted to the evolution of leadership styles in industrial development. The authors conducted a cross-sectional approach to a comparative analysis of leadership styles at different stages of industrial development in order to highlight the main differences and common elements. Scientists also used a systematic approach in the article to understand the interaction of factors of industrial development and the choice of leadership styles. The theoretical volume examines various approaches to leadership, and the practical aspect of the work is based on factual data and conclusions for the further use of the obtained results by modern leaders and managers.
Findings: The study found that technological change defines a new context for leaders, which requires adapting and developing new management skills such as flexibility, adaptability, and collaboration. The general conclusion of the article is that the evolution of leadership styles is closely related to industrial development and requires constant improvement and adaptation of managers to changes in the technological, economic, and socio-cultural environment.
Practical implications: Leadership is associated with technological and economic progress. The old approaches to leadership should be more relevant in today's world. Leaders must actively adapt their skills to new requirements, learn flexibility, and improve strategic thinking. Such changes in leadership practices have great potential to improve productivity and achieve success in the era of Industry 4.0.

Social implications: These articles can be used as a basis for developing modern strategies focused on the challenges of Industry 4.0 and will contribute to further developing leadership potential in conditions of constant change.
Originality/value: The study of the evolution of leadership in the context of industrial development consists of analyzing and comparing different leadership styles at different stages of industry. The study allows us to consider changes in leadership approaches and reveal their impact on organizational effectiveness and corporate culture. The work opens new perspectives for studying leadership based on the development of technologies and modern requirements for flexibility and sustainability in organizational management.

Keywords: leadership, leadership style, industry.

Category of the paper: Research paper.

Introduction

Throughout human history, especially in industrial development, leadership styles have played an essential role in shaping and transforming organizational management. From the beginning of the first industrial revolution, when the task was to ensure the efficient operation of mechanized factories, to today, when the integration of digital technologies defines new productivity standards, leadership has adapted to changes in the manufacturing environment (Yavari et al., 2020; Reisman, 1998; Kuzior et al., 2023).

The first stage of industrial development, defined by the massive introduction of mechanization and steam power, required effective control and coordination. Autocratic leadership styles were characteristic of this period, where management dominated processes, emphasizing standardization and production efficiency. With the development of the industry, the emergence of new technologies, and the increase in the complexity of the economic environment, the need for more flexible and creative approaches to management has emerged. This necessity led to a change in leadership styles, which caused the formation of transactional and transformational leadership, which are based on interaction and team development. In the Fourth Industrial Revolution period, characterized by digital transformation and the application of artificial intelligence, leadership in the conditions of Industry 4.0 becomes even more complex and requires managers' attention to innovation, strategic vision, and flexibility.

The study of different stages of the evolution of leadership styles in the conditions of industrial development is based on an understanding of the challenges and opportunities of management of each historical period. By examining the proposed evolution, one can better understand how leaders have adapted to change, contributing to the success of their organizations and the formation of new and innovative approaches to management in general.

1. Industry 1.0: labor mechanization and the First Industrial Revolution

Industry 1.0, often called the First Industrial Revolution, spans the period from roughly the mid-18th century to the mid-19th century. This period was decisive for transitioning from traditional manual production to the machine and mechanized labor system (Mohajan, 2019).

An essential feature of Industry 1.0 was the mechanization of industry and the introduction of steam power to replace manual labor (Broadberry et al., 2011; Clark, 2010). The factory system replaced artisanal production and shaped product mass production and standardization. This replacement led to the development of transportation infrastructure, including railroads and steamships, facilitating trade and transportation.

Industrial change created a new working class, especially in large cities and industrial centers. Working conditions were often poor, and standards needed to be tightly regulated (Apriliyanti et al., 2022). The period of the first industrial revolution was defined by centralized management and autocracy, where strategic decision-making was simplified and concentrated in the hands of rulers.

Industry 1.0 has made an enormous contribution to the social and economic landscape. The changes in the social structure and the increase in the urban population were irresistible. This period was characterized by rapid growth in industrial production. It marked the transition from a traditional rural economy to an industrial industry, laying the foundations for further technological innovation and social life and work changes (Vinitha et al., 2020).

The specific features of the Industry 1.0 era and the requirements of that period indicate the widespread use of *autocratic and analytical styles* of interaction with employees by managers (Homer, 1982; Steck, 2022).

The main emphasis in management using an *autocratic leadership style* consisted of the organization of the workforce, the mechanization of production, and the management of large factories. Leaders, often owners, had absolute power over decision-making. The task was to ensure the effective functioning of mass production. In this context, the autocratic management style proved effective and appropriate to the era's requirements (Harms et al., 2018). Leadership was aimed at ensuring standardization, efficient use of resources, and increased productivity through top-down control. The conditions of the time determined the need for order and organization, which made autocratic leadership the dominant style in the management of industrial production during the first industrial revolution.

Analytical leadership during the First Industrial Revolution was less pronounced than the autocratic leadership style. However, the management and organization of large factories were based mainly on mechanical solutions and optimization of production processes (Harris et al., 2011; Yammarino et al., 2005). Analytical leaders of the time focused on introducing mechanized technology and steam power to improve productivity and ensure production efficiency. The main principles of efficiency analysis considered the efficiency of mechanical

systems and ensured the stable operation of large-scale production. Leadership based on analysis during this period focused on optimizing processes through the introduction of new technologies and the intelligent use of resources. However, compared to later stages of industrial development, the analytical approach was a limited toolbox adapted to the specific requirements and opportunities of the period of the first industrial revolution.

2. Industry 2.0: electrification and mass production processes

Industry 2.0, or the period of the Second Industrial Revolution, spans the late 19th and early 20th centuries. One of the characteristics of this period was the widespread adoption of electrification and new energy sources, such as oil and gas, which revolutionized manufacturing processes and methods (Mohajan, 2020).

New forms of transportation appeared, including automobiles and airplanes, which expanded the possibilities of trade and movement of people. Industry became more mechanized and automated, and mass production became even more critical. This period was also characterized by the emergence of large monopolies and conglomerates, leading to the need to regulate markets and corporate activities (Bacon, 2007; Yin et al., 2017). Industry 2.0 was defined by intensive technological development and changes in production processes, which significantly improved production efficiency and economic growth.

The innovations of that time formed the need for effective management of large corporations, which led to the development of *transactional leadership* and strategic management. The primary attention of industry 2.0 leaders was directed to transactional relations between managers and subordinates, mainly to control the production process, standardization, and optimization of activities (Chan et al., 2005; Alharbi et al., 2021).

During this period of industrial development, emerging large corporations and factory enterprises highly valued the systematization and standardization of production processes. Transactional leadership reflected the need for clear hierarchical structures, control over the activities of subordinates, and setting standards to ensure efficiency and product quality. Transactional leaders focused on executing operations, ensuring planning and control through formalized procedures and standards. This approach was appropriate for effectively managing the large-scale production that characterized Industry 2.0.

Also, in the era of Industry 2.0, *performance-based leadership* has proven extremely important to adapt to the demands of mass production (Bradberry, 2012; Holton, 2000). Influential leaders were supposed to increase the organization's productivity, reduce production costs, develop and implement effective management methods to improve production processes, and optimize the use of resources. Performance-based leaders sought to develop standardized approaches to production, streamline work processes, and use new technologies to improve the

efficiency of production lines (Arvonen et al., 1999). This approach was particularly relevant in large factories, where the focus on mass production required the systematization and optimization of management approaches. Industry 2.0 leaders were innovative in developing and implementing methods that contributed to increased production efficiency and the development of new management standards.

3. Industry 3.0: automation of work processes and the Technological Revolution

Industry 3.0, or the Third Industrial Revolution, defined the second half of the 20th century. The main characteristics of this period were automation and the use of electronics, which led to increased automation of production and the development of new technologies such as computers and information systems (Mohajan, 2021; Connors et al., 2020). The growth of information technologies has opened up new opportunities for processing and sharing information, which has contributed to improving organizational performance and forming a networked society. Industry 3.0 has brought about significant changes in the production and management of organizations, causing the transition to the information society and new challenges in technology and the economy.

In this period, *transformational leadership* stimulated employees' creativity and personal development. Innovation and research in developing new products and technologies gained significant importance. The era of Industry 3.0 was defined by the globalization of the economy and the development of international corporations (Rifkin, 2011). The increase in the volume of international trade and the interdependence of economies became characteristic features of this period. Transformational leaders of this period began to emphasize the personal development of subordinates and the stimulation of the staff's creativity. Instead of focusing on control and standardization, transformational leaders prioritized developing their teams' potential, promoting personal growth, and creating conditions for expressing creative initiative. Leaders in Industry 3.0 also prioritized change and process improvement, as the rapid development of technology required adaptation and constant innovation (Ackoff, 1999; Bass, 1990). The ability to quickly respond to changes and effectively implement new technologies became a critical success factor. Transformational leadership in Industry 3.0 reflected a new approach to management with a focus on flexibility, creativity, and constant readiness for change to adapt to a rapidly changing economic environment (Shvindina et al., 2021).

Also, during this period, the need for *group leadership* or leadership based on group dynamics has become relevant due to changes in the structure of work groups and approaches to cooperation in organizations. Leaders in Industry 3.0 recognized the importance of group dynamics and teamwork. Instead of individualized leadership, they began to pay attention to

shared goals, communication, and interaction between team members (Barge, 1989; Jiang, 2021). Leaders tried to promote practical group work by stimulating interaction and exchanging ideas to achieve common goals. This approach met the requirements of the growing complexity and variety of tasks in Industry 3.0. Group leadership supports creating flexible, creative, and adaptable work groups to effectively solve tasks requiring diverse expertise and approaches.

Communicative leadership becomes essential to successful management due to the increasing complexity of organizational processes and the importance of effective communication in organizations. Communicative leaders of this period understood that effective communication within teams and between departments was essential for achieving common goals and solving problems (Hamrefors, 2010; Kuzior et al., 2021). The growing complexity of projects and the increase in the amount of information required managers not only to be able to communicate clearly but also to actively implement communication tools to ensure the clarity and efficiency of information exchange. Communicative leadership in Industry 3.0 focused on developing a culture of openness, mutual understanding, and interaction. Leaders have begun to use various communication tools, including remote work technologies and electronic platforms, to facilitate effective information sharing and collaboration in distributed and multi-level team structures.

4. Industry 4.0: digital transformation and unification of technologies

Industry 4.0, or the Fourth Industrial Revolution, represents the current technological and production innovation period. The main features of this stage are high-tech automation, increased interaction between digital technologies, artificial intelligence, and actual production (Xu, 2018; Ghobakhloo, 2020). Industry 4.0 includes using the Internet of Things (IoT), real-time data processing, large volumes of analytics, and enhanced interaction between humans and machines. This period aims to create "smart systems" and optimize production processes.

Industry 4.0 technologies expand the implementation of flexible and intelligent production systems, reducing production costs and increasing the organization's productivity. Artificial intelligence, machine learning, big data, and blockchain are used to optimize supply chains and improve product quality. Industry 4.0 is also marked by an emphasis on implementing digital technologies in all spheres of social life (Kuzior et al., 2023; Ingaldi, Ulewicz, 2019; Bilan et al., 2022) Industry 4.0 forms a new stage of technological development where production, information, and communications merge to create a more integrated and "smart" economy.

Intensive digital transformation and the introduction of advanced technologies require a *combination of transactional and transformational leadership*. Successful leaders must possess transactional leadership skills to ensure operational effectiveness in an environment of high technological change and unpredictability. Managing operational and resource efficiency are critical challenges in a rapidly changing economic environment. Transformational leadership is gaining importance in the era of Industry 4.0. Leaders must be able to create visions, motivate staff to innovate and be creative, and adapt the organization to the rapid changes in the technological landscape (Politis, 2002; Kalsoom et al., 2018). Combining transactional and transformational leadership becomes a critical success factor in Industry 4.0, where it is necessary to manage operations effectively, adapt to constant changes, and stimulate innovation.

Flexible and adaptive leadership are critical in today's realities, as the economic environment is subject to rapid and unpredictable changes due to the introduction of advanced technologies. Leaders focus on learning and adapting to constant changes in the development of technologies and markets, including the constant study of new products, mastering the latest digital solutions, and the ability to respond quickly to changes in the economic environment (Yuk et al., 2010). Flexible leadership considers the volatility and dynamics of Industry 4.0, where technological revolutions and new industrial paradigms can suddenly change the landscape of an organization's operations. Agile leaders understand that adaptability and flexibility become essential in the face of uncertainty and rapid technological change (Norton, 2010). In the era of Industry 4.0, leadership in conditions of uncertainty becomes an integral part of successful management due to constant changes in the technological landscape and organizational models. Leaders must possess decision-making skills under conditions of uncertainty and flexibility. Since Industry 4.0 is characterized by constant technological innovation, unpredictable changes in market conditions, and a high degree of complexity, leaders must be ready to adapt to new conditions and make decisions quickly. Such a modern trend requires leaders to develop strategic thinking skills, risk analysis, and the ability to adapt strategies in real-time (Kwilinski et al., 2020). Industry 4.0 leaders must be open to innovation, actively study new technologies, and look for ways to optimize processes in constant development and change. Flexibility and the ability to adapt to uncertainty are critical qualities of the modern leader.

Servant leadership is also necessary in rapid technological change and development. The support of employees determines servant leadership. Leaders of this type understand that ensuring the well-being and effectiveness of the team is essential to achieving shared goals in the face of change. Servant leaders work to create conditions for the development and success of each team member, promoting their personal and professional growth; that is, they support staff and provide resources for creative and innovative thinking, creating a favorable work environment for the development of employees' potential (Coetzer, 2017). Servant leadership in Industry 4.0 promotes the formation of flexible, high-performance teams ready to adapt to changes and implement innovations in work processes.

In today's environment, the importance of empathy and the ability to understand the needs and expectations of staff comes to the fore. Leaders in Industry 4.0 understand that human capital is a significant asset, and the ability to empathize plays a critical role in interacting with a team. *Empathetic leaders* actively listen to their employees, consider their needs, and consider the personal and professional aspects of their lives (Kock, 2018). They strive to create working conditions that promote self-expression and creativity, essential elements of successful work in Industry 4.0. Empathic leadership helps maintain and strengthen critical interpersonal relationships in the work environment by supporting and motivating the team in a rapidly changing economic environment and stimulating high levels of performance and job satisfaction of the staff.

5. Evolution of leadership styles in the context of social industrial development

Changes in the styles of the interaction of leaders with personnel occurred under the influence of developments in the social, economic, and technological environment, and each stage of industrial development was marked by its characteristics in leadership and management. Table 1 shows the evolution of leadership styles in the context of economic modernization of social life in the period of Industry 1.0, Industry 2.0, Industry 3.0, and Industry 4.0.

Table 1.
Leadership styles during Industry 1.0, Industry 2.0, Industry 3.0 and Industry 4.0

Period	Characteristics of the period	Leadership style	Characteristics of leadership style
Industry 1.0	Labor mechanization	Autocratic leadership	Centralized decision-making, strict hierarchy, minimal participation of subordinates, strict control, low level of employee satisfaction, dependence on the leader, and effectiveness in a crisis.
		Analytical leadership	Analytical thinking of the manager, factology, strategic planning, objectivity in solving problems and making decisions, the ability to consider alternatives, a systematic approach, and exactingness are less effective in a rapidly changing environment, where it is necessary to respond to new circumstances quickly.
Industry 2.0	Implementation of electrification and new energy sources	Transactional leadership	Through transactional relationships, motivation through incentives, and centralized decision-making, the leader evaluates and determines performance based on achieving specific goals and standards, focusing on performance and vertical structure.
		Performance-based leadership	Results orientation, performance rewards, and performance appraisal; the leader clearly articulates the expectations of each team member and defines performance standards, application of specific metrics, and key performance indicators to evaluate and measure success, individual recognition, and task orientation.

Cont. table 1.

Industry 3.0	Automation of work processes	Transformational leadership	The leader has a clear vision and defined goals, inspiration and motivation, stimulation of creativity, individual development of each team member, developed emotional intelligence in the leader, leadership ethics, and effective communication; the leader creates a favorable atmosphere for self-expression and self-realization of each team member, implementation of positive and transformational changes in the organization, collective identity.
		Group leadership	Involvement of employees by the leader for joint decision-making, development of group spirit, moderation of conflicts, group coordination, promotion of group determination, effective communication, facilitation of interaction between group members and creation of an atmosphere of mutual understanding, distribution of responsibility, creation of long-term group dynamics.
		Communicative leadership	Effective communication is the ability of the leader to actively listen to the thoughts and ideas of team members and provide constructive feedback, creating a clear vision; the leader can convincingly express his ideas and convince others of the importance and relevance of these ideas, adaptation to the audience, facilitating the acquisition of knowledge, conflict resolution, communication culture, the ability to empathize and understand the emotions and needs of other team members, change management.
Industry 4.0	Digital transformation and unification of technologies	Transformational + Transactional leadership	In the strategic vision, the leader uses the motivational elements of transformational leadership to stimulate self-development and team improvement, define expectations and rewards, develop leadership potential, apply effective communication that integrates the importance of mutual understanding and accomplishing tasks, leadership equity, the ability to implement change and drive innovation in the team, systematic approach, long-term cooperation.
		Flexible and adaptable leadership	Flexibility in decision-making, agility, fostering and encouraging creative thinking and innovative approaches, ability to learn, effective change management, collaboration, and communication, result-oriented, responsive to challenges, leadership empathy, willingness to change one's approach and style depending on the specific situations.
		Empathetic leadership	The leader shows the ability to feel and understand the emotions and experiences of his employees, active listening, the leader pays attention to the unique needs and expectations of each team member, encouraging the personal and professional development of employees, taking into account their goals and ambitions, openness to perspectives, involving the team in the decision-making process and taking into account their contribution, effective communication, responding to emotional context, creating and maintaining stable and trusting relationships in the team.

Source: Developed by the authors.

6. Conclusions

The history of the world's industrial development led to a constant transformation of leadership styles, reflecting the requirements and challenges of a certain period of time that arose before organizations and society (Khozhylo et al., 2022; Polyanska et al., 2022). In the period of Industry 1.0, when the industry underwent the first significant technological changes, autocratic leadership reflected the need for control and certainty in management. Industry 2.0 introduced the concept of transactional leadership, where management emphasized process optimization and production efficiency. Standardization and a systematic approach have become the main principles of management. The development of Industry 3.0 is associated with computerization and automation and has created the need for transformational and group leadership. Technological changes and increased complexity of tasks required leaders to focus on personal development and team cooperation. Modern Industry 4.0 creates the need for flexible leadership, which is focused on adapting to constant changes in the economic environment and introducing innovations into various organizational processes (Kuzior et al., 2022). Leaders must combine strategic vision, transactional and transformational elements, and servant and empathic leadership. The ability to make decisions in the face of uncertainty and maintain flexibility become attributes of a successful leader.

Thus, the history of the evolution of leadership styles indicates the need for constant adaptation and improvement of leadership by changes in the technological, economic, and socio-cultural environment. The challenges of industrial development have become essential prerequisites for the development of new approaches to leadership that promote cooperation, innovation, and flexibility for success in today's economic environment.

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