

Factors Influencing Organizational Quality Change in Smart Manufacturing Companies

Yonghua Han, Hui Sun, Xuemei Liu*, Ming Liu

School of Economics and Management, Liaoning University of Technology, Jinzhou, Liaoning, 121001, China

**Corresponding author*

Keywords: Organizational quality change, digital intelligence, environmental impact factors

Abstract: The development of digital intelligence technology has caused changes in the organizational management model, and smart manufacturing enterprises need to improve their market competitiveness and internal management capabilities in order to adapt to the digital intelligence environment, and also have a deeper understanding of the organizational understanding and management model has led to a new understanding of organizational change and thus organizational quality change. This paper mainly discusses the meaning of organizational quality change in the digital intelligence environment of smart manufacturing enterprises and what factors will have an impact on organizational quality change to provide a reference for the organizational quality change of smart manufacturing enterprises.

1. Introduction

China attaches great importance to quality management, in order to explore the organization's innovative, leading and promotional quality management model to stimulate society's attention to quality management to promote the implementation of the quality of a strong country strategy; the central government established the China Quality Award. Organizational quality management is reflected in six aspects which are quality concept management, quality development strategy management, quality management model, quality management method, quality management mechanism, quality management technology^[1]. Organizational quality represents the reorganization of the meaning of quality it is different from the traditional quality connotation characteristics, Zhu^[2] believed that organizational quality has four types of time characteristics and attributes: process, dynamic, systematic and generalized, and organizational quality change should focus on the meson-organizational level and establish the corresponding organizational quality evaluation index system. Xu^[3] based on the motive-function-regression thinking from the perspective of organizational structure, organizational goals, organizational functions, organizational culture, etc. to improve organizational quality to achieve organizational quality change. Organizational quality evaluation indicators differ according to the type of enterprises to choose indicators, aviation organization quality management can be evaluated from three first-level indicators of operational efficiency, operational safety, and management effectiveness^[4], construction enterprises can

evaluate organizational quality management from schedule management, quality management, and construction management^[5], but the level of knowledge, knowledge management, etc. have a role in promoting the organizational quality of different types of enterprises^[6]. More and more organizations are emphasizing the relationship between CSR and organizational quality, Ma^[7] found that CSR has a positive impact on internal organizational quality, but not significant the impact on external organizational quality, and affects external organizational quality by affecting internal organizational quality. For organizational quality change can be carried out in three stages: smart manufacturing design quality control, smart manufacturing process quality control, and smart manufacturing result quality control, developing smart product standards to ensure that the standards are met in the production process to complete dynamic quality monitoring and management and finally carrying out smart product quality assessment and organizational management assessment^[8]. Digitalization brings opportunities and challenges for organizational quality change, digitalization fundamentally changes products, services, management processes and people while digitalization improves organizational performance, digitalization and organizational quality change promote each other, digitalization provides ways and methods for organizational quality change, and organizational quality change promotes organizational digital transformation^[9]. Digitalization and organizational quality change are both for the sustainable development of the organization, and the task of completing organizational quality change in the digital intelligence environment combined with the new generation of information technology is difficult. To build an organizational quality management platform for smart manufacturing enterprises, Meng^[10] proposed that information technology should be adapted to the quality management model, and the information system-based organizational quality management platform can carry out dynamic monitoring and other management in the whole cycle, so as to improve organizational quality management and thus realize organizational quality transformation. Organizational change includes political, structural, and cultural process changes, and organizational quality change emphasizes quality as the center and customer satisfaction as the service goal. Modern management methods and technologies are used to control the quality impact elements to diversify the organizational quality management model and methods to improve quality and organizational performance^[11]. Wang^[12] believed that changing the organizational structure from a hierarchical management structure to a flat governance structure can maximize the transmission of information and help to gradually improve the quality management system and capabilities to enhance the efficiency of organizational decision-making. Chen^[13] believed that in the stage of high quality development, the overall, systematic and holistic direction should be used to improve the quality development of enterprise organizations through systematic management of organizational quality with refined and professional management level. According to the existing literature, organizational quality change not only mentions the change of production and product quality but also reflects the change of organizational structure, organizational management and organizational staff. This paper will combine the literature to study which elements will have an impact on the organizational quality change of intelligent manufacturing enterprises.

2. Organizational Quality Change

2.1. Organizational Quality Change Connotation

Along with the development of mobile Internet, big data and other digital information technology, the digital economy has gradually become the main driving force of economic growth; intelligent manufacturing enterprises in the context of digital intelligence began to digital, intelligent upgrade and transformation. Digital economy can promote the quality upgrade of

manufacturing enterprises^[14], quality change is a change from the concept, system, goals and other all-round all-factor a change, enterprises to provide high-quality products to meet user needs, industry to system perfection, structure rationalization, innovation capacity optimization, macro social and economic growth and stable development of balanced social equity inclusion, quality change final results of quantity increase and quality improvement and this process contains the full range of factors of production^[15]. Organizational change is continuous; change is to strengthen the organization's adaptability to the internal and external environment to improve organizational quality, the relationship between strategy, structure, systems, employees and other key role in the formation of organizational quality^[16]. Organizational quality is a series of management capabilities related to the organization's operational efficiency, organizational coordination level, organizational function adaptation, organizational system rationalization, employee motivation creation type and other activities related to the survival and development of the organization in response to changes in the internal and external environment, organizational quality change is to improve this capability according to the internal and external environment.

2.2. Organizational Quality Change Influencing Factors

2.2.1. Employee Quality

Employee quality has the components of employee quality, knowledge content, work ability, and work attitude. Employees' mental state, physical condition, work ability, and knowledge may have an impact on organizational quality. Magnavit^[17] found that work organization quality is inversely related to mental health problems through regression analysis of questionnaires and concluded that it is necessary to care for employees' physical and mental conditions to improve work organization quality^[18]. Malingo^[19] found that employee quality has a positive impact on R&D efficiency and corporate performance in manufacturing companies, and employee quality can also improve green technology in manufacturing companies. They found that employee quality improvement has substantial significance on the effectiveness of organizational planning. Zeng^[20] evaluated the quality of employees based on employee performance based on neural network. Employee quality can reflect organizational quality to some extent, and we can anticipate the degree of organizational quality change based on the level of employee quality.

Victoria^[21] designed a digital entrepreneurship platform to leverage employees' novel ideas to think creatively and promote entrepreneurial behavior. Dimitrios^[22] found that dominant factors such as leadership status and prestige, as well as trust between employees and leaders, and support positively changed employees' behavior and thus had a positive impact on organizational quality change by collecting and categorizing positive factors affecting affective, organizational, and operational elements. Highly qualified employees have higher integrity in the organization, and Li Xing^[23] found through the relationship between employee quality and audit costs that highly skilled employees avoid the risks that arise in the audit process, reduce audit workload and thus improve the organization's financial calculations. The level of education and educational level represents the high quality of employees. Companies with a high-quality workforce have less frequent internal violations and are less likely to make decisions in terms of accuracy and timeliness. The higher the quality of the crew, the more actively they drive organizational quality change. The core of organizational quality change is employee engagement, especially in a digital intelligence environment where the quality and level of employee engagement has a significant impact on the implementation of quality change in the organization. The stronger the sense of responsibility of employees, the higher the initiative, the more knowledge, and the higher the ability of teamwork among employees represents the higher the quality of employees, the stronger the work performance, thus driving the enterprise performance enterprise quality forward and promoting

organizational quality change.

2.2.2. Management Quality

Smart manufacturing enterprises have a strong systemic and comprehensive nature, a reasonable, dynamic and objective management model and methods are essential in the operation of the enterprise. From factor-driven development to innovation-driven development intelligent manufacturing enterprises must develop toward intensification and gain competitive advantage through management to improve the quality of the organization to adapt to the internal and external environment. Smart manufacturing enterprise production capacity, intelligent technology to match the management capacity, management quality improvement means the enterprise management structure, organizational goals, human resources management and other elements within the organization of the comprehensive optimization, thus promoting enterprise organizational quality change.

2.2.2.1. Impact of Organizational Structure on Quality Change

The new generation of information technology is integrating with intelligent manufacturing enterprises, and a new round of technological revolution and industrial change is driving the change of enterprise management structure. "This change in form has brought organizational effectiveness into full play. When data becomes a management-driven resource, flattening and plat forming start to be the direction of organizational transformation, and the organizational structure of intelligent manufacturing enterprises in the context of digital intelligence starts to evolve towards horizontal dilution of boundaries, vertical simplification of hierarchy, agility and flexibility, and innovation-enabled platforms^[24]. Organizational structure changes have a great impact on the complexity of organizational value-based management. The more centralized, formalized and horizontally integrated organizational structure variables affect the political, technical and cultural aspects of organizational value-based management, the more highly centralized the organizational structure is, the higher the adaptability of organizational value-based management, and the less vertically differentiated the organizational structure is, the higher the cultural adaptability of organizational value-based management^[25]. The increase in complexity of organizational value-based management means that the organization's value creation, value management and value measurement are effectively managed and the quality of operations and decision making is improved, which leads to the improvement of organizational quality. The development of information technology makes the organizational quality change has to consider the problem of enterprise information security management. Di^[26] studied the organizational structure of enterprise information security management network based on digital transformation and genetic algorithm for preventing and solving the information security risks and problems encountered by enterprises. Deng ^[27] argued that more enterprises choose platform-based organizations on the change of organizational quality change organization structure in compliance with the network information era.

2.2.2.2. Impact of Organizational Goals on Quality Management

Smart manufacturing enterprises need to continuously learn, optimize and update organizational goals and achieve organizational quality change driven by goal accomplishment in the complex market environment. Smart manufacturing companies develop new development strategies through goal management to improve the efficiency of production and operation, implement incentives through the degree of individual or departmental goal accomplishment to motivate the team to accomplish the overall corporate goals through common goals and shared responsibilities, and

upgrade the systems and organizational systems adopted by the organization and employees in the process of achieving goals to cause organizational quality improvement and thus promote organizational quality change. Fettouh^[28] through starting from two dimensions, performance review and activation assessment, it was found that the approach of activating goal management has a significant impact on the performance aspect of the company. Refinement and decomposition of organizational quality objectives are conducive to organizational quality management, and goal management is an effective measure and an important way for enterprises to control costs and improve management, which has a positive impact on enterprises to improve overall performance to achieve high quality development. Wang^[29] believed that whether the organizational goals are optimized, whether the organizational goal system is formulated, whether the organizational goal review subjects are diversified, whether the organizational goals are feasible, and whether the response mechanism of organizational goals and result application is perfect are all linked to the performance of intelligent manufacturing enterprises and affect the high quality development of the organization^[30]. Yang^[31] believed that clarity of organizational goals is positively and significantly related to employees' and leaders' psychological security and proactive change behaviors, and by making employees perceive organizational goals proactive change to achieve work goals and high quality organizational development.

2.2.3. Production Quality

The quality of production directly affects the economic performance of intelligent manufacturing enterprises determine the competitiveness of enterprises in the market, but also the key elements of organizational quality change. To product production quality to develop quality development developments strategy, quality control system optimization is the key to enhance quality development according to modern new information technology to build a quality control platform is an important means to implement high quality development, quality control of the production process as the driver to promote organizational quality change of the enterprise. Wang Bin and Wang^[32] realized the information integration of production quality management system by combining the production quality management system with other application systems of the enterprise through the method of system information integration, solving the problem of "information island" and overly complicated business processes, and receiving timely information to improve the production quality management decision rate to ensure product quality. The overall production quality level of intelligent manufacturing enterprises maps the degree of organizational quality change. Lai^[33] used data-driven quality inspection data to evaluate the production quality of enterprises and identify the production quality level of manufacturing enterprises while allowing enterprises to recognize their own production quality development and that of the industry to promote the implementation of organizational quality change. The quality characteristics of products during their service life should obey the optimal preventive maintenance is analyzed from both quality loss and product maintenance cost perspectives, thus enabling companies to reduce operating costs and extend product adaptation life and utilization. Functional production quality can no longer meet the market competition and production status quo, to achieve organizational quality change, the first step is to change the production quality of intelligent manufacturing enterprises from functional to application scenario development, and to improve production quality and efficiency by combining with the technology and mode of digital economy to fundamentally promote organizational quality change.

3. Countermeasures and Recommendations

3.1. Enhancement of Staff Quality Countermeasures and Suggestions

Organizational quality change employees are an important thrust of change, employees' first need to have quality change awareness in order to take the initiative to carry out quality change, by creating a quality knowledge learning platform, staff quality knowledge training, to create a corporate quality culture and other training staff quality change awareness. Secondly, we regularly hold activities such as selecting staff for further training, visiting and learning, quality education, etc. to improve staff literacy and knowledge, and carry out seminars to care about staff life and spiritual outlook to cultivate a sense of responsibility and participation. Finally, we establish a sound incentive mechanism to set up an incentive fund and send it to the employees with high contribution to quality change.

3.2. Countermeasures and Suggestions to Enhance Management Quality

Discover the company's own appropriate organizational structure, organizational system, organizational goals, etc., integrate the new round of information technology into management, correctly use strategic methods and tools, improve management strategic management theory and methods, optimize organizational goals and their management system. Optimization of organizational structure should ensure full participation and organizational fairness, ensure organizational structure continuity, consistency and differentiation, and ensure the company's financial support for sound employee performance assessment and incentive digital organizational structure optimization. Companies should optimize and closely link organizational goals with individual employee goals. At the same time, the company should enhance employee motivation through human resource management and the selection of core business that suits the internal and external environment. In addition, companies need to strengthen the cooperation of organizational members and improve organizational skills to ensure that corporate and individual goals are effectively linked to achieving the vision together. Enterprises should develop strategic objectives to optimize the principles of change. Enterprise departments develop corresponding programs to adjust the direction of quality change and the organizational structure. Managers establish management systems and upgrade information management platforms. Relevant personnel follow up on the corporate change process and monitor the progress of dynamic information-based organizational quality change.

3.3. Enhancement of Production Quality Countermeasures and Recommendations

Improve the quality of production first of all to determine the strengthening of standards control to enhance the quality awareness of employees, customize the standardization of product quality principles and rules for intelligent manufacturing enterprises, according to the different responsibilities for employees to carry out the corresponding quality knowledge training in order to fine production process quality management accurate product out quality control. Secondly, to enhance the organization of production equipment, production processes, intelligent manufacturing enterprises intelligent equipment performance and advanced production processes will affect the control of product quality. Finally, the reasonable use of quality management tools to continue to technical innovation, to promote the development of high-quality enterprises.

4. Conclusion

In this paper, we analyze the influencing factors of organizational quality change in intelligent manufacturing enterprises from three perspectives of employee quality, management quality and production quality, and propose corresponding organizational quality change suggestions according to the influencing factors. From the perspective of employee quality, the higher the quality of employees, the amount of knowledge, physical and mental condition, sense of responsibility, and initiative these factors employees have, the higher the factor content, the higher the employee quality is more conducive to the organization for quality change. From the perspective of management quality, the higher the degree of optimization of organizational structure, organizational goals combined with the implementation of digital intelligence environment, the faster the progress of organizational quality change. From the perspective of production quality, production quality change is the ultimate goal of organizational quality change, quality control system, quality management information platform, production equipment and technology to improve the level of production quality to promote organizational quality change to consolidate the foundation, drive organizational quality change.

Acknowledgements

This work is supported by Social Science Planning Fund Project of Liaoning Province (L22AGL013).

References

- [1] An S D. (2021) *Review and Foresight of China Quality Award--Recommendations on Quality Innovation Practices and Experience Promotion of China Quality Award-Winning Organizations*. *China Quality Supervision*, No.394 (09), 49-53.
- [2] Zhu S X. (2018) *Organizational Quality: Change and Maturity of Quality Management in School Education*. *Contemporary Education Science*, (10), 24-27.
- [3] Xu Y F, Zhao D D. (2020) *Research on Quality Improvement of Grassroots Teaching Organizations in Colleges and Universities*. *Higher Education Development and Evaluation*, 36 (04), 11-20+107-108.
- [4] Xu S. (2020) *Study on Organizational Quality Evaluation of East China Air Traffic Control Bureau*. *Nanjing University of Aeronautics and Astronautics*.
- [5] Wang Z H, Zhang Y. (2022) *Study on the Optimal Design of Construction Organization Quality Management Scheme-A Real Estate Jade Park Project as an Example*. *Engineering and Construction*, 36 (03), 871-873+888.
- [6] Artamonova O. S, Zlobina Z. N, Karganovaa. Yu. (2020) *Implementing of Knowledge Economy Standards for Quality Management Development of Organization*. *St. Petersburg State Polytechnical University Journal. Economics*, 13 (82), 91-99.
- [7] Mahourmellatparast. (2021) *An Assessment of the Impact of Corporate Social Responsibility on Organizational Quality Performance: Empirical Evidence from the Petroleum Industry*. *Operations Management Research*, 1-14.
- [8] Liu C Y, Li H, Zeng Y. (2014) *Research on Quality Control Methods for Service-Oriented Organizations*. *Standards Science*, No. 487 (12), 10-13.
- [9] FrÉDÉricponsignon, StÉPhaneKleinhaus, GrÉGoryBressolles. (2019) *The Contribution of Quality Management to an Organization's Digital Transformation: A Qualitative Study*. *Total Quality Management &Business Excellence*, 30 (Sup1), S17-S34.
- [10] Meng C, Song H W. (2011) *Equipment Quality Management Platform Organization System and Its Operation Mode*. *Military Automation*, 30 (09), 50-52.
- [11] Kang Y H, Xue B W. (2006) *From Total Quality Management to Systematic Framework-Transformation of Organizational Change Management Thought*. *Science and Management*, (03), 62-64.
- [12] Wang Q. (2022) *Changing the Organizational Structure of Schools to Stimulate the Vitality of School Operation--The Practice of Yuxin School Affiliated with Capital Normal University to Empower the High-Quality Development of Schools*. *Teaching Monthly-Secondary School Edition (Teaching Management)*, No. 947 (09), 7-10.
- [13] Chen Y. (2022) *Exploration of Organizational Quality Management in State-Owned Enterprises*. *Office Business*, No. 384 (07), 7-9.

- [14] Yuan Q G, Wang M Z. (2022) *Mechanisms and Effects of Digital Trade Empowering Quality Change in Manufacturing Industry - A Quasi-Natural Experiment from a Comprehensive Cross-Border E-Commerce Pilot Zone*. *Industrial Technology Economics*, 41 (01), 62-70.
- [15] Shi D, Zhao J B, Deng Z. (2018) *Change Mechanisms and Policy Measures for Promoting High-Quality Development*. *Research on Finance and Economics*, (09), 19-27.
- [16] Mahadeva M. (2022) *Time Series Analysis of Research Trends in Total Quality Management*. *Pearl: A Journal of Library and Information Science*, 16 (2), 98-104.
- [17] Magnavita Nicola. (2022) *The Impact of Quality of Work Organization on Distress and Absenteeism Among Healthcare Workers*. *International Journal of Environmental Research and Public Health*, 19 (20): 13458-13458.
- [18] Song M L, Wang S H, Sun J. (2018) *Environmental Regulations, Staff Quality, Green Technology, R&D Efficiency, and Profit in Manufacturing*. *Technological Forecasting & Social Change*, 133, 1-14.
- [19] Matthew Makarios. (2016) *Staff Quality and Treatment Effectiveness: An Examination of the Relationship between Staff Factors and the Effectiveness of Correctional Programs*. *Justice Quarterly*, 33 (2), 348-367.
- [20] Tseng Tsui Yuan. (2021) *Company Employee Quality Evaluation Model Based on BP Neural Network*. *Journal of Intelligent & Fuzzy Systems*, 40 (4), 5883-5892.
- [21] Victoriareibenspiess. (2020) *Tapping into the Wealth of Employees' Ideas: Design Principles for a Digital Entrepreneurship Platform*. *Information & Management*, 103287-103287.
- [22] Dimitrioshatjidis, Maria Charalampidou. (2022) *The Influential Synergy of Social Network Architectural Components on Employees' Positivity: A Conceptual Discourse and Implications for Organizational Change*. *International Journal of Work Organization and Emotion*, 13 (4), 305-329.
- [23] Xing L. (2020) *Employee Quality and Audit Fee: Evidence from China*. *Accounting and Finance*, 60 (5): 4533-4566.
- [24] Lei R G, Liang J. (2022) *Organizational Structure Change in the Context of Smart Manufacturing*. *Metallurgical Management*, (16), 58-62+79.
- [25] Nowotny Steven, Hirsch Bernhard, Nitzl Christian. (2022) *The Influence of Organizational Structure on Value-Based Management Sophistication*. *Management Accounting Research*, 56.
- [26] Di Z P, Liu Y, Li S M. (2022) *Networked Organizational Structure of Enterprise Information Security Management Based on Digital Transformation and Genetic Algorithm*. *Frontiers in Public Health*, 10, 921632-921632.
- [27] Deng N R, Huang S P, Wu Gu G S. (2022) *Research on Organizational Structure Evolution and Change in the Network Information Era*. *Chinese Institute of Command and Control (CICA)*. 5.
- [28] Fettouh Khaled. (2022) *Activating the Method of Management by Objectives and Its Impact on Institutional Performance: A Field Study for the Tax Directorate in the State of Mascara*. *Management Dynamics in the Knowledge Economy*, 10 (2), 142-153.
- [29] Wang J. (2021) *Study on Deepening the Reform of Budget Performance Target Management under the Framework of Comprehensive Implementation of Performance Management*. *Local Finance Research*, No. 205 (11), 50-57.
- [30] Danaeefard Hassan, AhmadzahitorshabAbdolali. (2021) *Explaining the Mediating Effect of Employee Morale between Organizational Goal Ambiguity and Innovative Work Behavior: Evidence from the Public Sector of Iran*. *International Journal of Public Administration*, 44 (13), 1129-1148.
- [31] Yang G, Zhou Y. (2021) *The Effect of Self-Sacrificing Leadership on Employees' Proactive Change Behavior: The Role of Psychological Security and Perceived Organizational Goal Clarity*. *China Human Resource Development*, 38 (06), 97-109.
- [32] Wang B, Wang M Q. (2007) *Production Quality Information Management and Integration in Discrete Manufacturing Enterprises*. *Aerospace Precision Manufacturing Technology*, No. 243 (01), 47-50+61.
- [33] Lai W F, Zwetsloot Inez Maria. (2022) *A Data-Driven Ensemble Ranking System of Production Quality Across Manufacturers -A Case Study for Risk Assessment in the Solar Industry*. *Quality and Reliability Engineering International*, 39 (2), 565-574.