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Research on the Impact of Management Information Competence on Agility in Sichuan Food Enterprises

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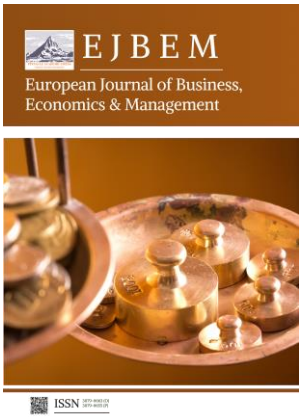

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Abstract: The Chinese food industry has evolved beyond the stage of rapid scale expansion and is now entering a mature phase driven by quality enhancement, operational efficiency, and technological innovation. In this context, enterprises are increasingly required to improve their internal capabilities to respond swiftly to market changes and digital transformation demands. This study focuses on Management Information Competence (MIC), defined as the organization's ability to effectively acquire, process, integrate, and utilize information to support decision-making, and explores its influence on organizational agility. Drawing upon an extensive literature review, the study refines the conceptual dimensions of MIC and organizational agility and proposes a series of hypotheses regarding the pathways through which MIC affects agility. To empirically validate these hypotheses, the research adopts a mixed-methods approach, combining questionnaire-based surveys, field visits, and statistical analysis. The investigation is conducted among food enterprises in Sichuan Province, a key region in China's food manufacturing landscape. Data collected from these enterprises are analyzed using structural equation modeling to examine the relationships between specific MIC components — such as information integration, real-time responsiveness, and decision support capabilities — and core aspects of organizational agility, including adaptability, responsiveness, and innovation capability. The results reveal that higher levels of MIC are positively correlated with enhanced agility, indicating that enterprises with stronger information management capabilities are better positioned to adapt to environmental uncertainties and pursue intelligent transformation. These findings contribute to both theoretical and practical domains: they enrich the academic understanding of MIC as a strategic enabler of agility and provide actionable insights for food enterprises seeking to navigate the challenges of digital and intelligent upgrading. Overall, this study highlights the strategic importance of Management Information Competence in fostering organizational agility and supporting the sustainable development of China's food industry in the digital era.

Keywords: Sichuan food enterprises; management information competence; corporate agility; impact research

1. Introduction

1.1. Industry Significance and Regional Context

As a fundamental pillar of China's national economy, the food industry plays a vital role in ensuring social stability, improving public health, and promoting economic development. The sector is closely interwoven with improvements in citizens' living standards, consumption habits, and overall purchasing power. In recent years, the food industry has evolved from meeting basic subsistence needs to fulfilling increasingly diversified and

personalized demands, thereby accelerating the need for supply-side reform and technological upgrading.

Sichuan Province, known for its rich culinary heritage and agricultural abundance, occupies a strategic position in the national food industry landscape. According to the Fifth National Economic Census Bulletin released by the Sichuan Provincial Bureau of Statistics in 2023, the province is home to over 39,000 corporate entities engaged in food wholesale, employing more than 300,000 workers. In addition, the region supports more than 34,000 food retail enterprises, which collectively provide employment to over 170,000 individuals. These figures not only underscore the scale of Sichuan's food sector but also highlight its pivotal role in regional employment and industrial output [1].

1.2. Emerging Challenges in the Digital Economy

Despite its growth trajectory, the Chinese food industry is facing unprecedented challenges amidst the rapid advancement of digital technologies and economic globalization. Escalating labor costs, fluctuating raw material prices, and increasingly fragmented consumer preferences are exerting pressure on traditional business models. The demand for personalized, health-conscious, and convenience-oriented food products has surged, driven by rising disposable incomes and changing lifestyles among urban populations. At the same time, intensifying competition from both domestic and international markets is compelling food enterprises to improve their efficiency, responsiveness, and product differentiation.

Moreover, the regulatory landscape is becoming more stringent, especially in areas concerning food safety, traceability, and environmental sustainability Enterprises are expected not only to comply with evolving standards but also to integrate technological solutions that support transparency and accountability across the supply chain [2].

1.3. Strategic Shifts Toward Digital and Intelligent Transformation

In response to these complex challenges, many food enterprises in Sichuan and beyond are accelerating their transition toward digital and intelligent manufacturing. This transformation goes beyond the simple adoption of information technology; it entails a profound reconfiguration of business operations, decision-making processes, and organizational structures. Core areas of transformation include enterprise resource planning (ERP), supply chain digitization, smart warehousing, and data-driven marketing strategies.

Additionally, the integration of big data analytics, cloud computing, and artificial intelligence is reshaping how food enterprises collect and interpret consumer data, optimize production workflows, and innovate in product development [3]. These technologies offer not only operational efficiency but also strategic agility, allowing firms to better anticipate market shifts and adapt swiftly.

However, successful digital transformation requires more than capital investment; it demands a shift in managerial mindset and the cultivation of key competencies, particularly in the domain of management information systems. This sets the stage for the current study, which investigates how Management Information Competence (MIC) can influence organizational agility within Sichuan's food enterprises, ultimately supporting the sector's long-term sustainability and competitiveness in the digital era.

2. Method

2.1. Literature Analysis

To establish a robust theoretical foundation for this study, a comprehensive literature analysis was conducted using academic databases and digital resources provided by major university libraries, including CNKI, Web of Science, and Scopus. The primary focus was placed on peer-reviewed journal articles, books, and industry reports related to Management Information Competence (MIC) and organizational agility. Keywords such as

"information capability", "agility", "digital transformation", and "strategic information systems" were used to guide the search. Through critical reading and thematic coding, the literature was classified into conceptual, empirical, and applied categories. This process enabled the identification of core dimensions and mechanisms through which MIC may influence agility in organizational settings. The synthesis of this body of work informed the development of the study's conceptual framework and research hypotheses.

2.2. Questionnaire

To quantitatively evaluate the relationship between Management Information Competence and organizational agility, a structured questionnaire was designed and distributed to employees within food enterprises across Sichuan Province. The instrument employed a 7-point Likert scale, where responses ranged from 1 ("Strongly Disagree") to 7 ("Strongly Agree"), to capture nuanced perceptions regarding information processing capacity, decision-making support, responsiveness, and adaptability. The questionnaire was divided into three sections: (1) demographic and organizational background, (2) MIC-related capabilities (e.g., data integration, system usage, and information accuracy), and (3) agility-related indicators (e.g., innovation speed, market responsiveness, and strategic flexibility). A combination of stratified and random sampling methods was employed to ensure representation across different firm sizes and industry segments. The online survey platform ensured accessibility and rapid distribution, while validity and reliability were pre-tested through a pilot study involving 30 participants.

2.3. Interviews

To complement the quantitative data and deepen contextual understanding, structured field interviews were conducted with senior executives and middle-level managers from selected food enterprises in Sichuan. The interviews followed a semi-structured protocol that allowed for both consistency across cases and flexibility to probe deeper into specific practices and perceptions. Key topics included current challenges in digital transformation, internal information system usage, decision-making processes, and perceptions of organizational agility. Each interview lasted between 45 and 90 minutes and was recorded (with permission) for transcription and qualitative analysis. These insights not only contextualized the survey findings but also revealed industry-specific nuances in MIC implementation and agile management practices that are not easily captured through standardized questionnaires.

2.4. Empirical Modeling

The empirical analysis was conducted using SPSS statistical software to examine the relationship between Management Information Competence and organizational agility among Sichuan-based food enterprises. Prior to analysis, the dataset was cleaned to remove incomplete or inconsistent responses. Covariance analysis was employed to explore the strength and direction of associations between the variables of interest. The results provided empirical support for evaluating the proposed hypotheses. SPSS outputs were interpreted in light of the conceptual framework developed from the literature review, ensuring that statistical findings aligned with theoretical expectations. While the analysis focused primarily on covariance patterns, descriptive statistics and cross-variable comparisons were also reviewed to enhance contextual understanding [4]

3. Result

3.1. Dimensions of Management Information Competence

Management Information Competence can be conceptualized through infrastructural foundations, managerial competencies, and talent proficiency, based on established IT capability frameworks. It generally involves three implementation phases: resource integration, analytical processing, and real-time insight generation for predictive modeling.

Additionally, the competence progresses hierarchically from foundational to applied and evolutionary capabilities.

Synthesizing existing literature, this study defines Management Information Competence as organizational capacities to analyze and mine multi-source data for evidence-based decision-making. Our operational dimensions comprise: Management Information Foundational Resources, Management Information Analytical Proficiency, and Management Information Governance Capacity [5]

3.2. Dimensions of Organizational Agility

Lowry et al., taking an information systems perspective, define organizational agility as the combination of information agility (the acquisition and use IT), system agility (the development, implementation, modification, and maintenance of IT) [6], and strategic agility (the ability to leverage IT capabilities), illustrating that organizational agility is-system driven [7]. Overby characterize agility through environmental sensing and responsive adaptation [8]. Additionally, organizational agility can also be seen as the ability to quickly perceive, react to, and strategically adjust to changes in the environment.

This research conceptualizes organizational agility as the capacity for self-renewal and rapid response to emergent conditions, determined by asset reconfiguration capabilities. We bifurcate agility into: Market Exploitation Agility: Responsiveness to customer dynamics; Operational Adjustment Agility: Adaptability in value-chain processes.

3.3. The Relationship between Management Information Competence and organizational Agility

Supply chain agility is a dynamic capability for enterprises to cooperate effectively with supply chain, integrate resources, and respond timely to changes in the market environment. High supply chain agility enables organizations to quickly sense and effectively respond to market fluctuations. However, the limited rationality of individual decisionmakers in enterprises and the rapid changes in the market environment may make it difficult for enterprises to make correct judgments.

Management Information analytic s capabilities can help enterprises quickly collect and analyze data, enhancing chain agility. Market sensing agility is the active sensing of external opportunities by enterprises and the active and continuous monitoring of external market environments. Big data capabilities are innovative IT competencies that not only focus on internal enterprise data but also support the collection and utilization of data from external market environments [9]. Big data capabilities help enterprises obtain timely data insights and uncover hidden patterns within internal datasets. The collection of data from organizations, enterprises, customers, and stakeholders injects new vitality into enterprises.

3.4. Research Hypotheses: Management Information to Organizational Agility

Contemporary enterprises face unprecedented data volume/complexity in collection, processing, and utilization. Management Information technologies enable knowledge discovery, while governance frameworks extract strategic value, enhancing operational responsiveness.

3.4.1. The Impact of Management Information Competence on the Market Agility Utilization

Market agility is characterized by the ability to discover new opportunities and rapidly improve products or services based on market demand, even without continuous observation of market changes [10]. In today's Management Information era, all market changes are embedded in large volumes of data.

Based on the above analysis, this paper proposes the following hypothesis:

H1: Management Information Competence has a significant positive effect on the promotion of market agility.

3.4.2. The Impact of Management Information Competence on Operational Agility

Operational agility is characterized by the ability of enterprises to respond quickly to changes in external environment. The various Management Information infrastructures of enterprises can quickly collect information from business departments, optimize operations, improve risk management, improve labor utilization, and even bring new business, enhancing organizational agility [11].

Based on the above analysis, this paper proposes the following hypothesis:

H2: Management Information Competence has a significant positive effect on the promotion of operational agility.

3.5. Descriptive Analysis of the Sample

The questionnaire survey was mainly completed online, distributing 350 questionnaires to senior and middle-level managers of food enterprises in Sichuan Province. A total of 309 questionnaires were recovered, with a recovery rate of 88.3%, which met the requirements of the study, including 301 valid questionnaires. Senior leaders accounted for 47.2%, while middle-level managers accounted for 5.8%.

3.6. Reliability and Validity

Test of the sample: The Cronbach's α coefficient for the entire questionnaire was 0.83, exceeding the standard threshold of 0.7 and indicating strong internal consistency. The α coefficients of each scale were greater than 0.8, the composite reliability (CR) exceeded 0.7, and factor loadings were all above 0.5, indicating satisfactory discriminant validity of the scale.

3.7. Correlation Analysis between Management Information Competence and Organizational Agility

The correlation coefficient between the basic resource capability of Management Information and market agility was positive and significant. The coefficients between the technical capability of Management Information and the two dimensions of organizational agility were 0.382 and 0.321, respectively, both statistically significant. These findings support Hypotheses H1 and H2.

Compared with the technical capability of Management Information, the correlation between its management capability and organizational agility was relatively higher and significant, indicating that management capability plays a greater role than technical capability [12].

4. Discussion

4.1. Strengthen the Basic Resource Competence of Management Information, and Improve the Agility of Enterprises

The basic resource competence of Management Information refers to the establishment of advanced data hardware facilities for enterprises (such as management information system), to achieve data communication and sharing inside and outside the enterprise, to strengthen the close contact between enterprises suppliers, other stakeholders, timely information exchange, to reflect the current business process execution and operation of enterprises in a timely and accurate manner, and to improve the efficiency of data resource utilization.

In a stable market environment, Sichuan food enterprises can obtain better shared service capabilities, reduce enterprise communication costs, and improve enterprise resource collaboration by strengthening the basic resource capabilities of data and deeply embedding the enterprise business architecture and product production process into the information technology platform, so as to form an agile advantage for enterprises. If the

market environment is uncertain, enterprises must consider the associated costs and benefits.

4.2. Strengthen the Competence of Management Information Analysis, and Improve the Agility of Enterprises

The ability of Management Information analysis is to deeply study the data of enterprises to activate the efficiency of data resources by using model algorithms, to find opportunities and innovations, to discover problems in the operation process of enterprises, to help enterprises optimize operation management, and improve the benefits of enterprises.

For Sichuan food production enterprises, it is necessary to strengthen the ability of big data analysis to cover all core business processes from raw materials to workshop production and offline sales, however, in food enterprises, the supply, production, and sales processes are relatively fixed, and it is necessary to strengthen consumer preference analysis, future market development prediction, competitor identification, and develop deeper and broader information technology capabilities to timely complete new product production technology transformation [13]

4.3. Strengthen the Competence of Management Information Management, and Improve the Agility of Enterprises

The competence of Management Information management is to make full use of enterprise data, to assist enterprise decision-making and insight development, to transform data capability into productivity, to better predict market opportunities for innovation and application, to make it easier for enterprises to transform and reorganize internal business processes, and to provide satisfactory services for enterprise customers.

Building corporate information technology capabilities requires continuous support from management and the participation of users. Firstly, corporate executives can identify key nodes where information technology and corporate agility interact, thereby increasing information technology investment and managerial risk tolerance. Secondly, enterprises can enhance the information technology management capabilities of business department personnel by organizing specialized training for employees and establishing learning and knowledge-sharing mechanisms. Thirdly, enterprises can establish long-term partnerships with external suppliers and sales agents to stabilize cooperation and reduce costs related to information technology operations and maintenance. These collaborations also help promote the effective transformation of knowledge, new technologies, and innovative applications.

To ensure the uninterrupted flow of enterprise data, Sichuan food enterprises need to continuously optimize and upgrade their information system infrastructure, enhance platform efficiency, reduce risks, and improve resource utilization. Enterprise managers should recruit and train professionals in information system management and analytics, while also promoting the use of information systems to drive organizational reform [14]. Enterprise supply chain agility depends on information system analysis capabilities to transmit data effectively, enhance responsiveness to customer needs and market changes, and improve operational efficiency and profitability.

5. Conclusion

In the era of big data, enterprises must attach great importance to data resources in order to achieve better business performance and benefits. They should cultivate and enhance their big data capabilities, including foundational resource capabilities, analytical capabilities, and management capabilities. First, enterprises should focus on developing basic resource capabilities by building a sound data infrastructure system and platform. Second, enterprises should develop big data analysis capabilities to activate and extract value from data, including through data collection, processing, and application. Third,

enterprises should focus on enhancing their big data management capabilities, especially in areas such as insight generation, perception, and data-driven decision-making. The improvement of big data capabilities can significantly enhance organizational agility.

Organizational agility refers to an enterprise's ability to respond to and cope with uncertain market environments. Managers should recognize the crucial role of big data capabilities in enhancing this agility. Improving big data capabilities enables organizations to sense and seize business opportunities, thereby boosting organizational performance and business outcomes.

Although this article explores the relationship between big data capabilities, organizational agility, and business performance, it still has several limitations, including a small sample size and insufficient time and resources to fully establish causal relationships among the three dimensions. Although this article explores the relationship between big data capabilities, organizational agility, and business performance, it still has several limitations, including a small sample size and insufficient time and resources to fully establish causal relationships among the three dimensions.

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