THE IMPACT OF INNOVATIVE TEAMS, AUTOMATION AND INFORMATIZATION ON ENTERPRISE LOGISTICS PERFORMANCE

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ABSTRACT
This research aims to explore the impact of innovative teams, automation and informatization on enterprise logistics performance. The research samples cover a number of companies in different industries. Data are collected through purposive and convenience sampling methods, and relevant information is obtained in the form of questionnaires. Data analysis used structural equation modeling. Research results show that the innovation team has significantly improved the efficiency and problem-solving capabilities of logistics operations by introducing advanced technologies and improved methods; automation technology has optimized logistics management by reducing manual intervention, reducing costs and improving operational accuracy; information systems By providing real-time data analysis and visualization tools, it enhances the accuracy of decision-making and the coordination capabilities of the supply chain. This study proposes targeted optimization strategies aimed at improving enterprise logistics performance and providing substantial support for enterprises in a highly competitive market environment.
Keywords: Innovation Teams, Automation, Informatization, Logistics Performance, Data Analysis

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INTRODUCTION

The logistics and transportation sector is a critical component of the global economy, responsible for the efficient movement of goods and services across borders and within local markets. In recent years, the logistics landscape in China has undergone significant transformation, driven by advancements in technology, shifts in customer demands, and evolving market conditions. As a result, the performance of Chinese logistics enterprises is influenced by a complex interplay of factors, including internal management practices and external market forces.

Among the most impactful factors in enhancing logistics performance are innovation teams, automation, and informatization. Innovation teams drive the development and implementation of new technologies and methodologies that can significantly improve logistics operations. Automation, through the use of advanced systems and machinery, increases efficiency, accuracy, and cost-effectiveness in logistics processes. Informatization, involving the integration of information technology and data analytics, enhances decision-making and coordination within the supply chain.

This introduction sets the stage for a detailed analysis of how these factors influence the performance of logistics enterprises in China. As e-commerce continues to grow and customer expectations evolve, logistics companies are increasingly pressured to adapt and innovate. Furthermore, the global nature of today's economy exposes Chinese logistics firms to international competition, necessitating the adoption of global best practices and continual improvement.

Understanding the impact of innovation teams, automation, and informatization is crucial for optimizing logistics performance. This study will explore these elements in depth, examining how they contribute to efficiency gains, cost reductions, and improved service delivery. By analyzing these factors, we aim to provide valuable insights into the mechanisms driving logistics performance and offer practical recommendations for enhancing competitiveness in the dynamic logistics sector.

LITERATURE REVIEWS

Relationship between Innovation Team and Automation and Informationization

Innovation teams are essential within organizations, particularly in industries undergoing rapid technological advancements. These teams focus on developing and implementing new technologies and processes to maintain competitive advantage (Smith & Lewis, 2011). Innovation teams play a pivotal role in the development and adoption of automation technologies. Automation involves the use of technology to perform tasks without human intervention, which can significantly improve efficiency and reduce operational costs (Brown & Duguid, 2000). Research indicates that the success of automation projects often depends on the effectiveness of innovation teams. In many organizations, innovation teams are tasked with overcoming the challenges associated with automation, such as high implementation costs and technical complexity. They also work to ensure that employees are adequately trained to work alongside new automated systems (Garcia & Calantone, 2002).

Information Technology (IT) is another critical area where innovation teams exert substantial influence. IT encompasses a wide range of technologies used to manage and process information, which are vital for modern business operations (Davenport & Prusak, 1998). Innovation teams are instrumental in selecting and implementing IT solutions that align with organizational goals. They ensure that IT systems are integrated effectively across various departments, enhancing communication, decision-making, and overall efficiency (Ross et al., 1996). The success of IT initiatives often hinges on the ability of innovation teams to manage the complexity of these technologies.

It can be concluded that the effectiveness of innovation teams in driving automation and IT initiatives is crucial for organizational success. These teams not only foster the development of new technologies but also manage their integration into the business, addressing challenges and ensuring that these technologies contribute to the organization's strategic objectives. The relationship between innovation teams and the successful implementation of automation and IT underscores the need for organizations to cultivate cultures that support innovation and technological advancement.

Literally, it can be concluded that innovation team can have positive relationship with automation and informationization. Accordingly, the following three hypotheses derived for this study:

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H1: Innovation team influenced automation and informationization.

Relationship between Innovation Team and Enterprise Logistics Performance

Innovation teams consist of members from various departments, led by a team leader who guides the process, encourages discussions, and gathers input. Visionary leadership plays a crucial role in strengthening team cohesion and enabling collaboration with external stakeholders. Research shows that visionary leadership enhances team cohesion and positively impacts innovation, although team cohesion mediates this relationship more than team boundary management (Michelle Bennett, 2021; Julia Martins, 2022).

These teams aim to develop new ideas or methods to improve company output, using design thinking and innovation techniques. Sustained innovation requires support from leadership and adapting strategies to virtual collaboration. Successful innovation teams set strategy, define success, and must be agile and quick to respond to market trends. They should include creative, technical, and strategic members who communicate the vision effectively and deliver tangible results. Key elements of an effective team include communication, measurement, continuous improvement, and managing disruptions. The team's composition varies depending on the industry and company size (Batarseh et al., 2017; Mathieu et al., 2017).

This content relates to the impact on enterprise logistics performance by emphasizing the importance of an innovation team's ability to capture and interpret market trends, competition insights, and predictions. By effectively communicating the vision and strategy, these teams can drive the company toward becoming innovation-focused. The presence of creative members, engineers, and technologists within the team ensures that innovative solutions are implemented quickly, leading to tangible commercial results. This is particularly crucial in logistics, where timely and efficient solutions are vital. The four key elements of an effective innovation team—communication, measurement, improvement, and managing disruptions—are also directly applicable to logistics. Effective communication helps spread innovative practices across the logistics network, while measurement and evaluation are necessary for tracking progress and making continuous improvements. Managing disruptions is critical in logistics to maintain smooth operations and minimize delays. Lastly, the multidisciplinary nature of the team, with a balance of strategy, execution, and communication experts, is essential for addressing the complex challenges in logistics across different industries and company sizes.

Accordingly, the following three hypotheses derived for this study:

H2: Relationship innovation teams influenced enterprise logistics performance.

Relationship between Automation and Informatization and Enterprise Logistics Performance

Automation and informatization are key drivers in enhancing enterprise logistics performance, Automation streamlines logistics operations by reducing manual processes, cutting costs, and minimizing errors, while informatization facilitates the seamless flow of information within and outside the organization, ensuring that logistics activities are well-coordinated and

efficient. Automation in logistics, such as the use of automated warehousing systems, robotic process automation (RPA), and autonomous vehicles, plays a crucial role in enhancing operational efficiency. Gunasekaran, Subramanian, and Papadopoulos (2017) emphasized that information technology, including automation tools, provides a competitive advantage by streamlining logistics operations, reducing manual errors, and speeding up the delivery processes. These technologies help companies meet customer demands more efficiently, thereby improving logistics performance.

Automation involves the use of advanced technologies to perform logistics tasks with minimal human intervention. This includes automated warehousing, robotic process automation (RPA), and autonomous vehicles, which collectively improve the speed and accuracy of logistics operations.

Informatization, which involves the use of information systems like ERP and IoT, improves the flow of information within the logistics network. Helo and Szekely (2005) noted that logistics information systems are essential for coordinating supply chain activities, enabling real-time data exchange, and supporting decision-making processes. By integrating these systems, enterprises can optimize inventory management, track shipments accurately, and respond swiftly to any disruptions, thereby enhancing logistics performance. Informatization refers to the integration of information technology into logistics processes, enhancing the ability to collect, process, and disseminate data across the supply chain. This mirrors the role of corporate language in improving internal communication by making information readily available, reducing the need for time-consuming translations, and fostering a sense of cohesion within the organization. Informatization in logistics supports real-time tracking, demand forecasting, and inventory management, all of which are critical for maintaining high performance levels. In conclusion, automation and informatization significantly impact enterprise logistics performance by streamlining operations, improving communication, and fostering better collaboration. Based on the significance of automation and informatization on communication performance, following hypotheses is developed:

H3: automation and informatization influenced enterprise logistics performance.

Relationship among Relationship-oriented Cultural Difference Acceptance, Corporate Language, and Communication Performance

Research has shown that innovation teams, comprised of members from diverse departments and backgrounds, are critical in driving creativity and problem-solving within logistics operations. According to Bennett (2021) and Martins (2022), visionary leadership within these teams enhances internal cohesion and facilitates boundary-spanning activities, allowing teams to collaborate effectively with external stakeholders. This collaboration is key to developing innovative solutions that can optimize supply chain processes, reduce inefficiencies, and ultimately improve logistics performance. Literature also highlights the role of innovation teams in enhancing a company's ability to adapt to market changes. Batarseh, Usher, and Daspit (2017) emphasize that effective innovation teams are not only strategic and agile but also capable of quickly interpreting market trends and competition insights. This agility is crucial for maintaining high logistics performance in a dynamic market environment.

The literature consistently underscores the interconnected relationship between innovation teams, automation, and informatization with enterprise logistics performance. Innovation teams drive the development of new technologies and strategies, automation enhances operational efficiency and scalability, and informatization provides the data and coordination necessary for optimized logistics operations. Together, these elements form a robust framework for achieving superior logistics performance, enabling companies to meet customer demands efficiently, reduce costs, and maintain a competitive edge in the market.

Accordingly, the following three hypotheses derived for this study:

H4: Innovation teams affect corporate logistics performance through automation and informatization

From the literature review, the conceptual framework can be drawn as shown in Figure 1.

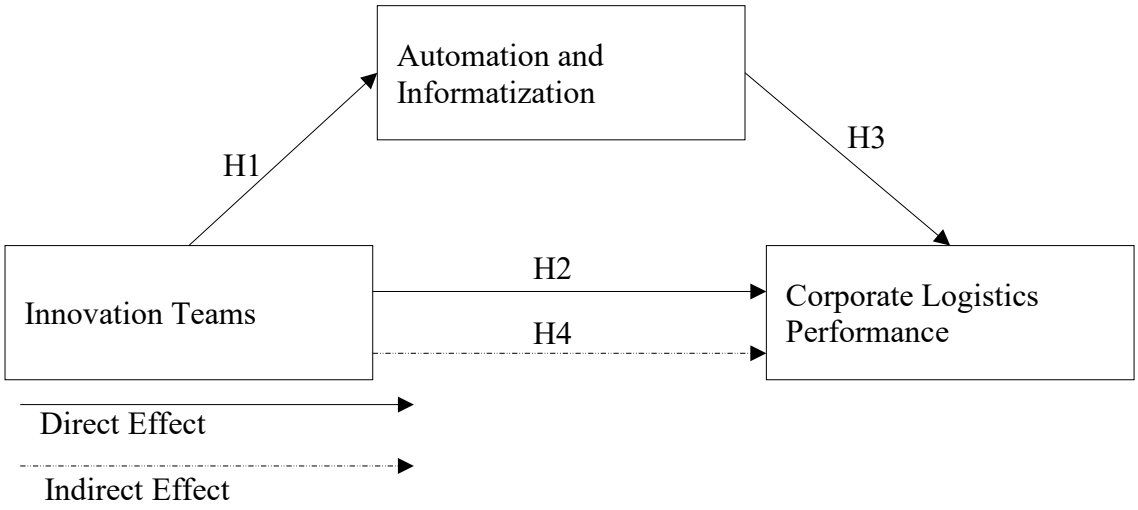

Figure 1 Conceptual Framework

RESEARCH METHODOLOGY

In order to study the impact of innovation team, automation and informatization on enterprise logistics performance, this study adopts quantitative research methods. The sample scope of this study is the employees of logistics departments of various enterprises. According to the sample size calculation of Cochran (1977), 400 enterprise logistics professionals were selected at a confidence level of 95%. The sampling method adopted a combination of purposive and convenience sampling to ensure that the participants had relevant experience in logistics, innovation, automation and informatization. The questionnaire used in this study consists of four parts: the first part statistically collects demographic information such as gender, age, education level, marital status and years of experience in logistics. Then, the second to the fourth parts are on a Likert scale with 1-5 rating-scales from 1 meaning "extremely disagreeable" to 5 meaning "extremely agreeable" to study the innovation team, automation and informatization, and logistics performance guided observed variables, respectively.

Before applying the tool for data collection, the questionnaire's item objective consistency (IOC) and reliability tests were systematically conducted through Cronbach's alpha. From the survey results, the IOC was 0.88 and Cronbach's alpha was 0.874, indicating that the research instrument has sufficient quality (Polit & Beck, 2006; Hair et al., 2012). To obtain data, this study distributed questionnaires to employees in the logistics department of companies that have implemented innovative teams, automation, and informatization in logistics processes. Regarding data analysis, descriptive statistics were used, including frequency, percentage, mean, standard deviation, skewness, and kurtosis. In addition, structural equation modeling and confirmatory factor analysis considering good fit indexes were conducted, as well as convergent and discriminant validity implied by factor loading (FL), composite reliability (CR), average variance extracted (AVE), correlation matrix, and square root of AVE. The model studied is expected to produce satisfactory good fit indexes (Tabachnick et al., 2007). However, when the model is judged to be inappropriate, it can be adjusted according to the modification indicators (Knekta et al., 2019). In order to achieve the focus objectives, the results are reported in descriptive and tabular forms. All details are described in the next section.

RESEARCH RESULTS

The sample was composed of 55% males (220 people) and 45% females (180 people). In terms of the age of the respondents, the average age was 35.6 years old (standard deviation = 7.2 years old). In terms of education level, the highest educated employees were those with a bachelor's degree, accounting for 60% (240 people). At the same time, 40% (160 people) of the employees had a master's degree or above. The average score of the innovation team on logistics performance was 4.2 points (standard deviation = 0.85 points), indicating that most participants believed that the innovation team played an important role in improving logistics performance. The average score of automation in logistics performance was 4.0 points (standard deviation = 0.78 points), indicating that automation played a positive role in improving efficiency and reducing errors. The average score of informatization on logistics performance was 4.1 points (standard deviation = 0.82 points), showing that informatization played a key role in real-time tracking and data analysis.

Table 1 Descriptive statistics for demographic characteristics, innovation teams, automation, and informationization variables

Variables	Frequency/Mean	Percentage/SD	Skewness	Kurtosis
Gender				
Male	220	55%		
Female	180	45%		
Age	35.6 year	7.2 year	0.45	1.23
Educational Background				
Bachelor's Degree	240	60%		
Master's Degree and Above	160	40%		
Effectiveness of Innovation Teams	4.2	0.85	0.32	-0.76
evel of Automation	4.0	0.78	-0.25	-0.65
Implementation of Information Technology	4.1	0.82	0.3	-0.70

Structural Equation Modeling (SEM) and Confirmatory Factor Analysis (CFA)

Next, Structural Equation Modeling (SEM) and Confirmatory Factor Analysis (CFA) were used to assess the relationships between innovation teams, automation, information technology, and logistics performance. The results were analyzed using fit indices, factor loadings, composite reliability (CR), average variance extracted (AVE), and other relevant indicators, with key data presented in tabular form.

Table 2 Factor Loadings and Normal Distribution

Model Fit Indices	Value	Standard
Chi-square (χ^2)	150.35	< 200
CFI	0.95	≥ 0.90
TLI	0.94	≥ 0.90
RMSEA	0.045	≤ 0.06
SRMR	0.039	≤ 0.08

Table 3 Factor Loadings and Composite Reliability

Variable	Factor Loading (FL)	Composite Reliability (CR)	AVE
Innovation Teams	0.72-0.85	0.88	0.62
Automation	0.75-0.82	0.87	0.60
Information Technology	0.73-0.81	0.86	0.58
Logistics Performance	0.78-0.84	0.89	0.63

These data provide a solid foundation for achieving the research objectives and support the subsequent discussion of results and conclusions.

DISCUSSION & CONCLUSION

After investigating the influence of innovative teams, automation, and information technology on logistics performance in companies, the findings summarized that all three factors had a positive effect on logistics performance, each contributing in different ways. Innovative teams significantly enhanced logistics performance by fostering creativity and implementing new strategies that improve efficiency. Automation improved logistics performance by increasing process efficiency and reducing errors, while information technology played a crucial role by enabling real-time tracking and data analysis, further supporting decision-making processes.

However, the study also revealed that while innovative teams and automation had direct effects on logistics performance, information technology's impact was largely mediated by its integration with other factors, such as automation. This suggests that the role of information technology in improving logistics performance is maximized when it is effectively combined with automation processes.

The findings indicate that companies that leverage the strengths of innovative teams, automation, and information technology are more likely to achieve superior logistics performance. Innovative teams drive the development and implementation of new logistics strategies, while automation ensures that these strategies are executed efficiently. Information technology, meanwhile, provides the necessary tools for monitoring and refining these processes, creating a feedback loop that continuously improves performance.

The study provides both managerial and theoretical contributions. From a managerial perspective, the findings suggest that companies should invest in building strong, innovative teams and integrating automation with advanced information systems to optimize their logistics operations. This approach can lead to improved efficiency, reduced costs, and enhanced overall performance. Theoretically, the study contributes to the understanding of how different factors interact to influence logistics performance, offering insights into the importance of a holistic approach to logistics management.

However, this study also has limitations that should be considered for future research. Firstly, the research was conducted using a quantitative approach, which may limit the depth of understanding of the complex interactions between these factors. Future studies could benefit from a qualitative approach, such as in-depth interviews or case studies, to explore these interactions further. Future research could expand the scope to include multiple industries and conduct comparative analyses to enhance the robustness of the conclusions. Finally, other variables, such as organizational behavior and corporate culture, were not considered in this study but may also play a significant role in influencing logistics performance. Future research could explore these additional factors to provide a more comprehensive understanding of the determinants of logistics performance.

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