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Article

A study of the impact of regional O2O teaching quality on the digital transformation of listed companies

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Abstract: With the acceleration of global digital transformation, listed companies urgently need to adapt to this trend in order to enhance competitiveness and achieve sustainable development. Focusing on the data of listed companies in China over the period from 2010 to 2022, this study examines the role of regional O2O teaching quality in the process of corporate digital transformation and its influence mechanisms. It is found that regional O2O teaching quality has a significant facilitating effect on the digital transformation of listed companies, and this effect is more pronounced in companies with larger financing constraints, larger firm sizes, and less institutional attention. In addition, regional O2O teaching quality further accelerates the digitalization process of enterprises by enhancing the management's foresight and innovation awareness. High-quality O2O teaching not only enhances employee skills and innovation but also facilitates management's ability to make longer-term planning and decisions in the face of a rapidly changing market environment, laying a solid foundation of talent and technology for an enterprise's digital transformation. These findings provide new perspectives on how listed companies can utilize regional educational resources to promote digital transformation and provide practical guidance for the development of related digital strategies.

Keywords: O2O teaching quality; digital transformation; management myopia; financing constraints

1. Introduction

In a globalized and technology-driven economic environment, the digital transformation of listed companies has become the key to achieving competitive advantage and sustained growth [1–3]. Digital transformation involves not only adopting new technologies to improve decision-making and operational efficiency but also enhancing the customer experience through personalized services and market segmentation to gain a leading position in the market [4]. Successful implementation of this transformation not only optimizes resource allocation and improves operational efficiency but also enables firms to demonstrate greater agility and efficiency in the face of market volatility and changing consumer demands [5,6].

The quality of regional O2O (online-to-offline) teaching plays a crucial role in this transformation process. High-quality O2O teaching can effectively enhance employees' digital skills and innovation capabilities, providing the necessary talent support for the digital transformation of organizations. By integrating online and offline teaching modes, O2O teaching not only improves the efficiency and quality of teaching but also provides employees with a flexible and diverse learning experience, which is conducive to the rapid enhancement of employees' skills and the timely updating of their knowledge.

Although regional O2O teaching plays an important role in promoting the digital transformation of listed companies, the mechanism of its influence has not been sufficiently explored in academia. To fill this research gap, this study empirically examines the effect of regional O2O teaching quality on corporate digital transformation using data from listed companies in China from 2010 to 2022. It is found that regional O2O teaching quality has a significant positive effect on the digital transformation of listed companies, especially among companies with greater resource constraints and less external attention.

The contribution of this study is to provide a new perspective and empirical support for the necessity and urgency of the digital transformation of listed companies. Through an in-depth analysis of the mechanism of the role of regional O2O teaching quality, this study emphasizes the importance of high-quality teaching for the implementation of corporate digital strategies. In addition, this study reveals the differences in the impact of regional O2O teaching quality in different enterprise environments, which provides a reference for enterprises to develop effective digital transformation strategies according to their own characteristics [7–9].

In summary, this study not only expands the understanding of the impact of regional O2O teaching quality on enterprise digital transformation but also provides theoretical and empirical support for listed companies to formulate effective digital strategies and provides valuable references for enterprises to maintain their competitive advantages in the rapidly changing market environment.

2. Mechanisms and hypotheses

2.1. Regional O2O teaching quality and digital transformation

The facilitating effect of regional O2O teaching quality on enterprise digital transformation can be understood from two perspectives, namely, enhancing talent cultivation efficiency and strengthening organizational innovation atmosphere.

First of all, from the perspective of talent cultivation efficiency, regional O2O teaching quality provides more flexible and diverse learning methods for enterprise employees through the combination of online and offline teaching modes. This teaching mode can effectively adapt to the learning habits and needs of different employees and enhance the relevance and effectiveness of learning. As described by Kim [10], high-quality O2O teaching can promote the rapid dissemination and absorption of knowledge and skills, help employees quickly master the key skills needed for digital transformation, and thus improve the efficiency of the entire enterprise in resource allocation and utilization.

Second, from the perspective of organizational innovation climate, the spirit of collaboration and interaction emphasized in the quality of regional O2O teaching builds a positive and open learning culture for enterprises [11]. Under the influence of this culture, the enterprise encourages knowledge sharing and teamwork among employees, creating a work environment conducive to innovation. This not only enhances the innovation ability and motivation of employees but also provides a constant impetus for technological innovation and solution development in the process of digital transformation. At the same time, high-quality O2O teaching also focuses on cultivating employees' critical thinking and problem-solving skills, which are

particularly important when enterprises deal with the various challenges encountered in the process of digital transformation.

In summary, the quality of regional O2O teaching provides strong support for the digital transformation of enterprises by enhancing the efficiency of talent training and strengthening the innovation atmosphere within the organization. This not only helps enterprises to utilize and allocate resources more effectively but also provides a solid foundation for them to maintain their competitiveness and innovation in the rapidly changing market environment.

In summary, this paper proposes hypothesis 1: Regional O2O teaching quality promotes the digital transformation of enterprises.

2.2. Mediating effect of management myopia on regional O2O teaching quality affecting digital transformation

Regional O2O teaching quality effectively inhibits the shortsightedness of enterprise management through the values of continuous learning, innovative thinking, and long-term planning it advocates, thus facilitating the digital transformation of enterprises. First, the flexibility and interactivity of regional O2O teaching provide a platform for continuous learning for enterprise employees, making knowledge updating and skill enhancement possible, which directly enhances the ability of enterprises to cope with digital challenges. Second, the O2O teaching model encourages innovative thinking and cross-border cooperation, which brings new solutions and business models to enterprises, which is crucial for their innovative development in the process of digital transformation. Finally, the long-term planning and ethics emphasized by the regional O2O teaching quality prompt the management of enterprises to consider a wider range of stakeholders and long-term impacts when making key decisions, thus avoiding decisions that merely pursue short-term benefits and laying a solid foundation for sustainable development and digital transformation. In summary, regional O2O teaching quality effectively inhibits management's short-termism through these mechanisms and provides support and facilitation for the digital transformation of enterprises.

Therefore, this paper proposes the hypothesis that regional O2O teaching quality inhibits management shortsightedness through inhibiting management shortsightedness and then facilitates the digital transformation of enterprises.

3. Model construction and data description

3.1. Model construction

According to the research setting of this paper, Equation (1) is constructed to examine the impact of regional O2O teaching quality on digital transformation:

$$\mathrm{DIG}_{i,t} = \alpha_0 + \alpha_1 \mathrm{O2O\ Teaching\ Quality}_{i,t} + \sum \mathrm{Controls}_{i,t} + \mathrm{Year} + id + \varepsilon_{i,t} \quad (1)$$

In Equation (1), *i* denotes the firm, *t* denotes the year, $\mathrm{DIG}_{i,t}$ represents the firm's level of digital transformation in year *t*, and $\mathrm{O2O\ Teaching\ Quality}_{i,t}$ denotes the firm's level of regional O2O teaching quality within the same year, as measured by the two variables and jointly. In addition, $\sum \mathrm{Controls}_{i,t}$ is a control variable, year and

id are year and individual fixed effects, and $\varepsilon_{i,t}$ is a random error term.

To further test the mediating effect of managerial myopia, this paper constructs Equations (2) and (3):

$$\text{Myopia}_{i,t} = \alpha_0 + \alpha_1 \text{O2O Teaching Quality}_{i,t} + \sum \text{Controls}_{i,t} + \text{Year} + id + \varepsilon_{i,t} \quad (2)$$

$$\text{DIG}_{i,t} = \alpha_0 + \alpha_1 \text{Myopia}_{i,t} + \sum \text{Controls}_{i,t} + \text{Year} + id + \varepsilon_{i,t} \quad (3)$$

where $\text{Myopia}_{i,t}$ represents the level of management myopia, Equation (2) aims to analyze how regional O2O teaching quality slows down the myopic behavior of corporate management and thus has an impact on corporate long-term strategic decisions, while Equation (3) is used to assess the strength of the impact of management myopia on corporate digital transformation. These two models allow for a more in-depth exploration of the indirect impact mechanism of regional O2O teaching quality on firms' digital transformation, i.e., facilitating firms' long-term technological innovation and digitization processes by changing management's myopic behavior.

3.2. Description of variables and data sources

3.2.1. Explained variables

Digital transformation (DIG): the metric of enterprise digital transformation (DIG) draws on and integrates the approaches of Wu et al. [12] and Zhao et al. [13] in order to achieve a comprehensive and precise quantification of the extent of enterprise digital transformation. Specifically, Wu et al.'s [12] approach involves five key dimensions, including artificial intelligence, big data, cloud computing, blockchain, and digital technology applications, and contains 76 relevant keywords. The core of the method is to comprehensively capture the activities and developments of enterprises in these key technology areas through extensive word frequency analysis so as to comprehensively assess the depth and breadth of enterprises' digital transformation. In contrast, Zhao et al.'s [13] approach focuses on four dimensions, namely digital technology application, Internet business models, smart manufacturing, and modern information systems, covering 99 digitization-related terms, and aims to assess enterprises' efforts in adopting emerging digital technologies, developing new business models, and transforming traditional manufacturing and information systems.

This study defines the degree of digital transformation (DIG) of firms in the data analysis phase mainly based on Wu et al.'s [12] methodology, based on the comprehensive and broad nature of their approach. In order to increase the robustness of the study, this paper employs Zhao et al.'s [13] method (DIG2) as a proxy variable in the robustness checking stage to further validate the stability and reliability of the results of this study. Through the application of this dual methodology, this study not only ensures a comprehensive and accurate assessment of the extent of digital transformation in enterprises but also enhances the robustness and reliability of the findings.

3.2.2. Explanatory variables

Regional O2O teaching quality (Confucian): the article designs the questionnaire with four dimensions: teaching behavior, teaching cognition, knowledge construction, and external environment, and uses the entropy method to construct personal O2O teaching quality. Referring to Du's study [14], the strength of regional O2O teaching quality is measured using the mean values of individual O2O teaching quality within a 200 km (r_200) and 300 km (r_300) radius of the company's registered location. The advantage of this measure is that it not only takes into account the distribution density of regional O2O teaching quality in a certain area but can also more accurately reflect the popularity and influence of regional O2O teaching in the location of the company.

3.2.3. remaining variables

Mechanism variables

Management myopia (Myopia): this study draws on Hu et al.'s [15] methodology to measure management myopia through quantitative analysis. Specifically, we constructed a word frequency analysis framework based on 43 words related to short-term horizons. These words are considered to be effective in reflecting management's short-term focus when writing management discussion and analysis (MD&A) reports. The index is calculated by taking the percentage of these short-term horizon words in the total word frequency of MD&A and multiplying it by 100 to obtain a quantitative index of management short-termism.

Control variables

To ensure that this study can reduce the interference of other variables and decrease the bias of the estimation results when exploring the relationship between regional O2O teaching quality and firms' digital transformation, we meticulously selected a series of key control variables. First, firm size (size) serves as an important control variable that reflects a firm's market influence and resource allocation capacity, which may have a significant impact on a firm's ability and willingness to undergo digital transformation. Second, capital structure (Lev), as an indicator of a firm's financial stability and risk tolerance, has an indirect impact on a firm's decision to make digital investments. In addition, the net rate of return on total assets (ROA), as a key indicator of a firm's profitability, can reflect the operational efficiency and profitability level of a firm, thus having an impact on a firm's ability to invest in digital transformation. Meanwhile, corporate growth (growth) is also included as a control variable, which reveals the growth potential and market expansion capability of a company and is an important guide to the urgency and likelihood of a company to undergo digital transformation. Finally, board structure, including the number of directors (Board) and the proportion of independent directors (Indep), as a reflection of the diversity and independence of corporate decision-making, has an important impact on the strategic direction and execution of corporate digital transformation. With these comprehensively considered control variables, this study aims to provide a more accurate and comprehensive analysis to explore in depth the actual impact of regional O2O teaching quality on enterprise digital transformation and to ensure the reliability and validity of the findings.

3.3. Data sources and descriptive statistics of variables

In this paper, the conceptual stocks in China's Shanghai and Shenzhen markets from 2010 to 2022 are selected as research objects. Among them, the financial and regional O2O teaching quality data come from the WIND and CSMAR databases. In terms of data processing, we took the following measures: (1) ensure that companies meet the statistical standards of national industries; (2) ensure the completeness of the concepts and their representativeness; (3) exclude ST-marked companies; (4) disregard companies in the year of the IPO and those observations with incomplete data; and (5) trim the continuous data before and after 1% to reduce the bias of the extreme values on the results. After screening, we obtain unbalanced panel data covering 63 firms with a total of 723 data points.

Table 1 shows the descriptive statistics for the key variables. For the dependent variable, firms' digital transformation (DIG), the data show a mean of 2.490 and a standard deviation of 1.155, ranging from 0 to 5.366, reflecting the variability and imbalance of the industry in terms of digital transformation. This result suggests that despite the obvious digitalization efforts within the industry, there are still significant differences in the degree of transformation and maturity. Regarding the intensity of regional O2O teaching quality, the mean values of the two indicators are 2.647 and 3.272, with standard deviations of 0.471 and 0.455, respectively, demonstrating the prevalence and stability of regional O2O teaching quality in the selected sample. This finding implies the intensity and prevalence of regional O2O teaching quality on different geographical scales, providing an empirical basis for further exploring its potential impact on digital transformation. In terms of control variables, the statistics on the variables of firm size (Size), capital structure (Lev), net rate of return on total assets (ROA), firm growth (Growth), and board structure (Board and Indep) reveal the plurality and complexity of the firms in the sample. In particular, the large standard deviations of firm size and capital structure point to differences in resource allocation and financial strategies across firms. These differences may have a significant impact on firms' digital transformation strategies and capabilities.

Table 1. Results of descriptive statistics.

Variable	*N*	Mean	SD	Min	Max
DIG	28,123	2.490	1.155	0	5.366
r_200	28,123	2.647	0.471	0.693	3.912
r_300	28,123	3.272	0.455	0.693	4.369
Size	28,123	22.80	1.530	19.12	26.46
Lev	28,123	0.539	0.197	0.0702	0.975
ROA	28,123	0.0314	0.0540	−0.208	0.196
Growth	28,123	0.264	0.897	−0.692	6.459
Board	28,123	2.194	0.212	1.609	2.773
Indep	28,123	0.375	0.0586	0.333	0.571

3.4. Correlation analysis

According to **Figure 1**, the correlation coefficients of r_200 and r_300 with DIG

are 0.1 and 0.091, respectively. This indicates a slight positive correlation, implying that as regional O2O teaching quality increases, the degree of digital transformation in enterprises also increases. Although the correlation is not very strong, this positive association provides preliminary evidence for the role of regional O2O teaching quality in firms' digital transformation.

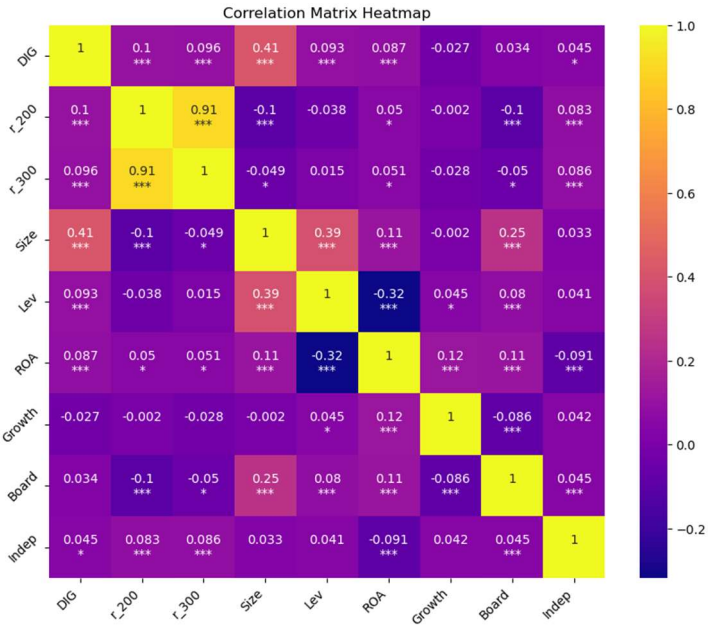

Figure 1. Heat map of Pearson correlation.

Note: *, ** and *** indicate significant at the 10%, 5% and 1% levels, respectively. Same below.

Among the control variables, the correlation coefficient between firm size (Size) and DIG is 0.41, showing a moderately positive correlation, indicating that larger firms are more likely to undergo digital transformation. This may be due to the fact that larger firms typically have more resources and capabilities to invest in new technologies and innovations. The low correlation coefficient between capital structure (Lev) and DIG suggests that there is no significant relationship between debt level and firms' digital transformation. The correlation coefficient of the net rate of return on total assets (ROA) is 0.087, indicating a relatively limited direct link between profitability and digital transformation.

The correlation between firm growth and DIG is also insignificant, implying that a firm's growth potential does not directly determine the extent of its digital transformation. The weak correlation between board structure (board and index) and DIG may reflect the fact that the size and independence of the board are not decisive factors in the strategic decision-making process of digital transformation.

In summary, the analysis of this correlation matrix heat map reveals a slight positive correlation between the strength of regional O2O teaching quality and firms' digital transformation, as well as providing evidence that firm size may be an important predictor of digital transformation. These findings are revealing for understanding how regional O2O teaching quality affects firms' progress on the digitalization path and also suggest the need to consider firm size and resource allocation when developing a digitalization strategy.

4. Empirical analysis

4.1. Benchmark regression results and discussion

As shown in **Table 2**, firstly, r_200 and r_300 are both significantly and positively correlated with the digital transformation of enterprises at the 1% level, with specific coefficients of 0.2077 and 0.2026, respectively, which strongly suggests that the impact of regional O2O teaching quality is significant and positive in the digital transformation of enterprises, and with the increase of the intensity of regional O2O teaching quality, the degree of digital transformation of enterprises increases accordingly. The coefficient of size is significant in both models, with coefficients of 0.3337 and 0.3356, which are also significant at the 1% level. The coefficient of Lev is insignificant in both models, with coefficients of 0.0885 and 0.0612, and standard errors of 0.1656 and 0.1667, respectively, suggesting that there may not be a significant relationship between capital structure and the digital transformation of enterprises. significant relationship. The coefficient of ROA is significant at the 1% level, indicating that firms' profitability significantly and positively affects their degree of digital transformation. The coefficients of Board and Indep are insignificant in both models, which may imply that the composition and independence of the board of directors do not have a significant impact on digital transformation. Overall, these benchmark regression results suggest that regional O2O teaching quality intensity and firm size have a significant positive impact on firms' digital transformation, while profitability is likewise an important contributor to digital transformation. These findings provide empirical evidence on the role of regional O2O instructional quality in economic decision-making and provide an important reference for firms when formulating their digitalization strategies.

Table 2. Results of the benchmark regression.

Variables	DIG	DIG
r_200	0.2077***	-
	(0.0577)	-
r_300	-	0.2026***
	-	(0.0645)
Size	0.3337***	0.3356***
	(0.0204)	(0.0204)
Lev	0.0885	0.0612
	(0.1656)	(0.1667)
ROA	1.5823***	1.5529***
	(0.4808)	(0.4836)
Growth	−0.0300	−0.0282
	(0.0285)	(0.0287)
Board	−0.1897	−0.1974
	(0.1326)	(0.1326)
Indep	−0.1722	−0.1935
	(0.4900)	(0.4906)

Table 2. (*Continued*).

Variables	DIG	DIG
Constant	−5.2785***	−5.3943***
	(0.5370)	(0.5518)
R-squared	0.5587	0.5581

Note: Robust standard errors clustered to the firm level are in parentheses; all regressions control for control variables, year, and firm fixed effects; all sample sizes are 28,123 below.

4.2. robustness and endogeneity tests

As shown in **Table 3**, columns (1) and (2) show the results of the robustness test for replacing the digital transformation measurement variables. In the regressions in columns (1) and (2), the coefficients of r_200 and r_300 are 0.3373 and 0.2889, respectively, which are both significant at the 1% level. Not only is this result highly statistically significant, but the magnitude of the coefficients also suggests that the intensity of regional O2O instructional quality has a strong positive effect on DIG2. This finding reinforces the conclusion of the preliminary regression results that the influence of regional O2O teaching quality has a significant role in facilitating the digital transformation of firms.

Table 3. Results of robustness and endogeneity tests.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	DIG2	DIG2	r_200	DIG	r_300	DIG
r_200	0.3373***			0.3070***		
	(5.2760)			(3.1743)		
r_300		0.2889***				0.2835***
		(3.9705)				(3.1641)
ZJPF			0.3338***		0.3458***	
			(18.7366)		(19.7175)	
Constant	−5.9580***	−6.0137***	1.8617***		2.4705***	
	(−9.8112)	(−9.6714)	(9.8381)		(16.1404)	
R-squared	0.4955	0.4919	0.6089	0.1591	0.6541	0.1537

Columns (3) through (6) employ Chastity Junction Place (ZJPF) as an instrumental variable designed to address possible endogeneity issues. The estimated coefficient of ZJPF as a proxy variable for regional O2O teaching quality is 0.3338 for r_200 in Column (3) and 0.3070 for r_300 in Column (4), indicating that this instrumental variable strongly confirms the relationship between regional O2O teaching quality and digital transformation. After controlling for the endogeneity issue of regional O2O teaching quality, the regression results in columns (4) and (6) continue to show that r_200 and r_300 are significantly positive at the 1% level with DIG, further reinforcing the results of the benchmark regression.

4.3. Heterogeneity analysis

The results in **Table 4** demonstrate the heterogeneity of the impact of regional O2O teaching quality on firms' digital transformation for firms with low and high

financing constraints, small- and large-scale firms, and firms with low and high institutional focus.

Table 4. Results of heterogeneity analysis.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Low Financing Constraints (SA)		High Financing Constraint SA		Small-scale Enterprises		Large-scale Enterprises		Low Institutional Attention		High Institutional Attention	
Variables	DIG	DIG	DIG	DIG	DIG	DIG	DIG	DIG	DIG	DIG	DIG	DIG
r_200	0.1452		0.1302**		−0.0226		0.1603**		0.2519***		0.0879	
	(0.1915)		(0.0559)		(0.0977)		(0.0745)		(0.0799)		(0.0962)	
r_300		0.2519		0.1118*		−0.0390		0.1612*		0.2136**		0.1233
		(0.2118)		(0.0607)		(0.1050)		(0.0885)		(0.0939)		(0.0991)
Constant	−5.4133***	−6.0392***	−5.0014***	−4.9954***	−2.1780*	−2.1278*	−5.3957***	−5.4963***	−5.6327***	−5.7090***	−4.1583***	−4.3176***
	(1.2933)	(1.3661)	(0.6847)	(0.6927)	(1.2490)	(1.2549)	(0.8993)	(0.9083)	(0.6385)	(0.6665)	(1.0736)	(1.0843)
R-squared	0.6385	0.6413	0.5989	0.5982	0.5898	0.5899	0.5570	0.5568	0.6033	0.6012	0.5785	0.5792

Among firms with low financing constraints, the effects of r_200 and r_300 are not significant, which may indicate that the impact of regional O2O teaching quality is masked by other factors in a relatively well-funded environment. In contrast, among firms with high financing constraints, the coefficient on r_200 is 0.1302, significant at the 5% level, while the coefficient on r_300 is 0.1118, significant at the 10% level. This finding implies that the positive impact of regional O2O instructional quality is more significant among firms with greater financing constraints, possibly because firms rely more on the values in regional O2O instructional quality to guide their long-term growth strategies in the context of resource constraints.

In the size analysis, r_200 and r_300 are not significant for small-scale firms, while the coefficients of r_200 and r_300 for large-scale firms are 0.1603 and 0.1612, which are significant at the 5% and 10% levels. This suggests that regional O2O teaching quality has a more significant positive impact on digital transformation in large-scale enterprises, probably because large-scale enterprises have more resources and greater organizational capacity to absorb and practice the values of regional O2O teaching quality.

When institutional focus is taken into account, r_200 and r_300 are significant at the 1% and 5% levels in low institutional focus firms, while the coefficients are not significant in high institutional focus firms. This may imply that intrinsic cultural factors, such as the quality of regional O2O teaching, have a more significant impact on firms' decision-making and transformation strategies when they are subject to less external scrutiny.

To summarize the above analysis, there is significant heterogeneity in the role of regional O2O teaching quality in the digital transformation of different types of firms. In particular, the positive impact of regional O2O teaching quality is more prominent in high-financial constraints and large-scale enterprises, as well as in enterprises with low institutional focus. These results not only deepen our understanding of the role of regional O2O instructional quality in firms' strategic decisions, but also provide a basis for customizing recommendations based on firms' characteristics for business management practices and policy formulation.

4.4. Mechanism effect analysis

As shown in **Table 5**, in columns (1) and (2), r_200 and r_300 show significant negative correlations with myopia, with coefficients of −0.0198 and −0.0182, respectively, and both of them are significant at the 1% level. This result suggests that as the intensity of regional O2O instructional quality increases, the tendency toward management myopia significantly decreases. This is consistent with the values of long-term planning and prioritization of global interests emphasized by regional O2O instructional quality and reveals that regional O2O instructional quality may influence firm behavior by shaping management's long-term decision-making orientation.

Table 5. Results of the analysis of mechanism effects.

	(1)	(2)	(3)
Variables	**Myopia**	**Myopia**	**DIG**
r_200	−0.0198***		
	(0.0048)		
r_300		−0.0182***	
		(0.0048)	
Myopia			0.9583***
			(0.2921)
Constant	0.4187***	0.4261***	−5.0787***
	(0.0622)	(0.0634)	(0.5457)
R-squared	0.2089	0.2072	0.5580

In column (3), a significant positive correlation is shown between management myopia (Myopia) and firms' digital transformation (DIG) with a coefficient of 0.9583, which is significant at the 1% level. This suggests that a reduction in management myopia is strongly associated with an increase in the degree of digital transformation at the firm. This may reflect the fact that firms are more likely to make long-term strategic investments, including digital transformation projects, under management that is less affected by shortsightedness.

Overall, these results support the mediating role of management myopia in the impact of regional O2O teaching quality on firms' digital transformation. Not only does regional O2O teaching quality directly affect digital transformation, but it may also indirectly contribute to digital transformation by reducing management myopia. These findings strengthen the economic basis for understanding how cultural factors in supply chain management influence firms' strategic decisions and innovation behavior and provide insights for firm management and policymaking.

5. Conclusions, recommendations and shortcomings

5.1. Conclusion of the study

In today's wave of the digital economy, the industry, as a dynamic field, is experiencing a profound digital transformation. Using data from listed companies in China from 2010 to 2022, this study conducted a systematic empirical analysis of the role of regional O2O teaching quality in promoting the digital transformation of

enterprises. It is found that regional O2O teaching quality not only positively promotes the digital transformation of enterprises, but also that this impact shows significant heterogeneity across different types of enterprises. In particular, the impact of regional O2O teaching quality is particularly significant among relatively capital-constrained firms, larger firms, and those firms that do not often receive attention from institutional investors. The findings further reveal how regional O2O teaching quality facilitates digital transformation by influencing the behavior of firms' decision-makers, i.e., reducing management myopia. Under regional O2O teaching, management is more inclined to move beyond short-term financial performance to focus on long-term technological innovation and the sustainability of the firm. This finding emphasizes the important role of educational factors in shaping corporate strategy and driving technological innovation. In summary, this study not only provides new research perspectives on the digital transformation of the industry but also offers lessons that can be learned from the digital transformation of other traditional industries, especially in developing countries that are rich in educational resources. Through a deeper understanding of the connotation of regional O2O teaching quality and its application in modern enterprise management, enterprises can be better guided to seize the development opportunities brought by digitalization and achieve long-term competitive advantages.

5.2. Policy recommendations

First, enterprises should pay attention to and invest in the construction and optimization of O2O educational resources, especially in the design of training content and the innovation of teaching methods. By providing customized training programs related to digital transformation, it can accelerate the improvement of employees' skills and lay a solid foundation for the digital transformation of enterprises. Second, it is recommended that enterprise management establish a long-term vision of development, go beyond reliance on immediate financial performance, and pay more attention to technological innovation and the construction of corporate culture. This requires enterprises to incorporate the long-term planning and ethics advocated by O2O teaching quality into their decision-making to ensure the sustainability and effectiveness of their digital transformation strategies. Finally, given the heterogeneity of the impact of regional O2O teaching quality on different types of enterprises, it is recommended that enterprises consider their own specific circumstances, such as capital status, enterprise scale, and market focus, when implementing digital transformation. For enterprises with tight capital or large scale, it is more important to strengthen the utilization of O2O teaching resources and, at the same time, actively attract external investment to enhance the visibility and attractiveness of enterprises in the market. With these three recommendations, enterprises will not only be able to effectively respond to the challenges of the digital economy era but will also be able to maintain sustained growth and innovation in a competitive market.

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