Sales Employment in the Digitalization Era: Empirical Evidence from Listed Companies

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Abstract：In the era of the digital economy, the impact of digital transformation on enterprise labor employment has garnered significant attention. Based on data from Chinese listed companies from 2011 to 2022, this paper empirically examines the impact and transmission mechanisms of digital transformation on the scale of sales personnel. The research findings indicate that digital transformation significantly increases the number of sales personnel and optimizes the labor structure of enterprises through mechanisms such as enhancing self-management and self-motivation, adjusting salary levels, and improving operational efficiency. Heterogeneity analysis reveals that the effect of digital transformation on the number of sales personnel is more pronounced in high-tech enterprises, technology-intensive enterprises, and companies in central regions. This study provides empirical evidence for accurately assessing the impact of digital transformation on sales personnel employment and offers policy insights for optimizing labor allocation and enhancing market competitiveness in the digital economy era.

Keywords: Digital Transformation, Sales Personnel, Employment, Labor Structure Optimization, Heterogeneity Analysis

1. Introduction

Corporate digitalization is a crucial micro-level form of the digital economy, profoundly influencing the supply-demand matching in the labor market. At the same time, employment in the digital economy exhibits differential effects and varying impacts across different groups and regions. Expanding the positive effects of digital economic development on specific employment groups while mitigating its differential effects and negative impacts to promote more refined and sufficient employment is an important practical issue.

In reality, sales personnel are a key force in driving enterprise development. They not only serve as the interface between enterprises and customers/markets but also represent a critical resource for marketing and business expansion. Sales personnel play a unique strategic role within enterprises, and their capabilities and performance directly influence market share and competitiveness. Therefore, it is necessary to further explore the specific impact of digital transformation on the employment mechanisms of sales personnel to fill gaps in existing research and provide more comprehensive references for businesses and policymakers.

Driven by the digital economy, enterprise digital transformation not only presents new opportunities and challenges for sales personnel but also has a profound impact on the number of sales personnel. The development of the digital economy enables enterprises to better meet market demand and enhance customer experience. These changes in demand require more sales personnel to handle the increased sales and customer relationship management. Furthermore, digital transformation not only optimizes existing business operations but also creates new commercial opportunities. The rapid proliferation of e-commerce and social media has significantly increased the market demand for digitally proficient sales personnel[1].Despite the large number of marketing graduates in China, there is an acute shortage of multidisciplinary marketing talents aligned with the digital economy, which has prompted enterprises to increase their demand for sales personnel with digital skills [2-3]. In response, Liu(2019) suggested that establishing a scientifically sound incentive mechanism is essential for enhancing work enthusiasm and enterprise loyalty. A well-structured incentive system not only effectively stimulates the motivation of sales personnel but also strengthens their sense of belonging and responsibility, reducing turnover and improving

corporate stability and long-term development potential [4]. Current research on incentivizing sales personnel and preventing their turnover mainly focuses on two aspects:

Internal Factors: These include career planning and job satisfaction. First, the lack of career planning is a significant cause of sales personnel turnover. Many sales personnel leave not solely due to dissatisfaction with salary but due to the absence of career development prospects [5]. Second, job satisfaction directly affects employees' turnover behavior. Emotional dissonance and negative emotions reduce job satisfaction, increasing turnover tendencies. A supportive work environment can significantly enhance the job satisfaction and performance of sales personnel [6–8]. Additionally, the study by Gao and He(2019) pointed out a significant interaction between the work characteristics of sales personnel and resilience. Perceived job demands increase stress, whereas job control and social support provide sufficient resources to enhance resilience, thereby fostering intrinsic motivation and proactive learning behaviors [9]. Similarly, proactive coping strategies and role stress significantly influence job engagement. Effective coping mechanisms and lower role stress improve sales personnel's job engagement and satisfaction [10]. Finally, positive emotional management and support significantly enhance the performance of sales personnel [11].

External Factors: These mainly include salary levels, workplace infrastructure, and organizational culture. Luo(2001) discussed the design of compensation mechanisms for sales personnel, highlighting that an optimal compensation system should include a combination of base salary and performance bonuses to maximize motivation and effort[12]. Salary levels are the primary cause of turnover, as sales personnel's compensation is largely commission-based. To address this, enterprises can implement hierarchical management and differentiated incentive mechanisms to effectively identify and reward high-performing sales personnel, provide promotion opportunities, and stimulate upward motivation[13]. Wang (2005) emphasized that companies should provide high-quality customer resources and market support to help sales personnel work more efficiently, improving performance and confidence[14]. Furthermore, dissatisfaction with workplace infrastructure is also a major reason for turnover [15]. Reducing office space and hardware resources may push sales personnel to spend more time meeting clients and developing business, but it simultaneously diminishes their sense of belonging and loyalty. Organizational culture and atmosphere also influence employee retention. A positive organizational culture and a supportive work environment can effectively retain and attract outstanding sales talent.

This study will conduct an in-depth investigation into the impact of digital transformation on the demand for sales labor in enterprises and its underlying mechanisms. Using data from Chinese publicly listed companies from 2011 to 2022, we empirically examine the impact of digital transformation on the number of sales personnel and analyze the specific transmission pathways. The potential marginal contributions of this study are as follows:

This paper systematically reviews the impact of digital transformation on both internal and external incentives for sales personnel and details the transmission mechanisms. This review contributes to micro-level human capital research by elucidating how enterprises under digital transformation internally incentivize sales personnel to reduce turnover while externally enhancing workforce expansion.

In addition to investigating the overall impact of digital transformation on sales personnel numbers, this study empirically examines the mechanisms of salary adjustment and operational efficiency improvement, enriching the theoretical and empirical research on the microeconomic effects of digital transformation on the labor market and addressing gaps in existing studies.

This paper incorporates industry attributes, geographical location, and factor intensity into the empirical analysis to explore whether digital transformation has heterogeneous effects on sales personnel numbers. Through detailed analyses of different types of enterprises and regions, this study provides valuable insights for businesses adapting to market changes in the digital economy and for policymakers in formulating targeted policies. Specifically, by revealing the differential effects of digital transformation across various contexts, this research offers concrete empirical evidence for optimizing human resource allocation and enhancing market competitiveness in the digital transformation process.

2. Theoretical Analysis and Research Hypotheses

From the perspective of internal incentive factors for sales personnel, digital transformation brings several significant benefits.

First, the development of digital transformation

enhances the autonomy and flexibility of sales personnel through digital tools and platform-based economies. Zhang et al. (2021) pointed out that digital technologies and artificial intelligence make organizations more open, flat, and flexible, enabling sales personnel to leverage these technologies for more effective information retrieval and internal networking, thereby enhancing self-leadership behaviors [16]. Self-leadership includes not only fundamental self-management strategies such as self-monitoring, goal setting, and self-reinforcement but also higher-level self-influence strategies, such as behavior-focused strategies, natural reward strategies, and constructive thought pattern strategies. These strategies help sales personnel accomplish their tasks more efficiently and improve job performance. High performance not only brings a sense of achievement and satisfaction but also enhances job embeddedness—the degree of an employee's reliance on and adaptation to their position. Xu et al. (2021) found that by gathering information and engaging in internal networking, sales personnel can more effectively obtain market intelligence and customer insights, thus improving sales performance [17]. This positive feedback mechanism not only reduces sales personnel turnover but also attracts more highly qualified talent, thereby increasing the number of sales personnel. Second, digital transformation improves the work environment and support systems for sales personnel, allowing them to complete tasks more efficiently. Through digital transformation, sales personnel gain access to more customer information and market data, thereby improving work efficiency and customer satisfaction. A favorable work environment and strong support systems significantly enhance job satisfaction and performance, reducing turnover rates and attracting more top-tier sales talent. Mao et al. (2019) further supported this view, noting that the use of the internet reduces working hours, facilitates career development, and enhances job satisfaction [18]. As businesses upgrade technologies and expand operations during digital transformation, they provide multiple career paths, title advancements, and job rotation opportunities, giving sales personnel a clearer vision of career development. This career development support not only boosts job satisfaction and loyalty among existing sales personnel but also attracts high-potential external talent, thereby increasing the overall number of sales personnel. Third, digital transformation leverages intelligent management systems and data analytics tools to better understand the pressures and needs of sales personnel, providing targeted support and resources. Digital tools also help sales personnel manage time and tasks more effectively, increasing their sense of job control and autonomy, thereby enhancing their resilience and work engagement. Additionally, enterprise-internal social platforms allow sales personnel to communicate more conveniently with colleagues and supervisors, gaining emotional support and encouragement, which strengthens team cohesion and employees' sense of belonging. This, in turn, further improves their job performance and satisfaction.

From the perspective of external incentive factors for sales personnel, digital transformation exerts a significant impact through multiple mechanisms.

First, Wang(2020) found that the digital economy enhances productivity by improving data and information flow, expanding the breadth and depth of technology applications in production and distribution, transforming traditional business processes, and lowering market entry barriers [19]. Increased production efficiency allows enterprises to operate at lower costs and higher efficiency while expanding their production and sales scope, thereby creating more job opportunities. Furthermore, improvements in corporate productivity and economic benefits lead to higher employee wages. Higher salaries attract more highly skilled sales personnel, strengthening the company's market competitiveness. Wage growth not only directly motivates sales personnel but also increases their loyalty and job satisfaction. Since sales personnel's compensation structure is primarily commission-based, the sales efficiency improvements brought by digital transformation directly influence their earnings, thereby boosting motivation, stabilizing the workforce, and increasing the number of sales personnel. Second, empirical analysis by Chen et al. (2022) revealed that corporate digital transformation significantly enhances operational efficiency, particularly in improving management effectiveness [20]. Digital transformation not only directly improves corporate management efficiency but also fosters business model innovation, further enhancing operational performance and market competitiveness while optimizing internal management processes and resource allocation. During digital transformation, enterprises utilize automation, data analytics, and intelligent management tools to more effectively monitor

and evaluate sales personnel performance, providing timely feedback and support. This not only improves the overall efficiency of sales teams but also enables businesses to respond more rapidly to market changes, expand their market reach, and increase the demand for sales personnel. Third, digital transformation optimizes the skill structure of sales personnel, making them more competitive and better equipped to adapt to changes in the labor market. Digital transformation significantly increases demand for high-skilled sales personnel while exerting a substitution effect on low-skilled sales personnel. This shift not only enhances the overall skill level of sales teams but also facilitates the rapid adaptation and development of mid- to high-skilled sales personnel in the context of digital transformation.

In summary, the mechanisms through which digital transformation influences the number of sales personnel are illustrated in Figure 1. Based on these mechanisms, the following hypotheses are proposed:

H1: Digital transformation increases the number of sales personnel.

H1a: Digital transformation raises employee wage levels, thereby attracting more sales personnel to join enterprises.

H1b: Digital transformation optimizes corporate management processes and improves managerial efficiency, enhancing sales employees' work environment, job satisfaction, and career sustainability, thereby reducing sales personnel turnover rates.

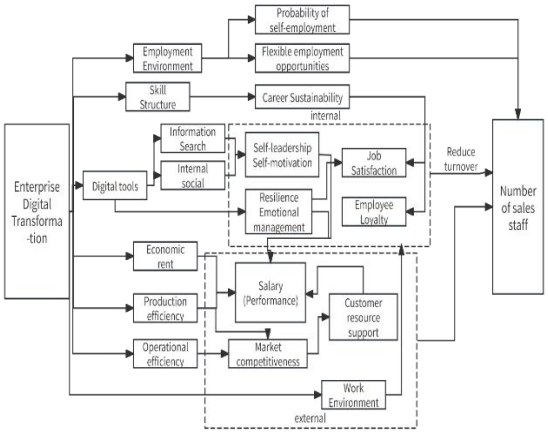

Figure 1. Analysis of Impact Mechanism

3. Model Design and Empirical Analysis

3.1Data Sources and Processing

This study selects data from publicly listed companies between 2011 and 2022 as the initial sample. The raw data were obtained from the China Stock Market & Accounting Research (CSMAR) database. To ensure the robustness of the research results, the following data processing steps were undertaken: Excluding financial, insurance, and real estate companies; Removing firms classified as ST or ST enterprises during the sample period; Eliminating samples with severe missing values in key variables.

To mitigate the impact of outliers on the research findings, all continuous variables underwent a 1% two-tailed winsorization.

3.2 Model Construction

To examine the impact of enterprise digital transformation on the number of sales personnel, the model is specified as follows:

$$Sale_{it} = \beta_0 + \beta_1 \ln dig_{it} + \sum \beta\, CV_{it} + \sum Year + \sum Ind + \varepsilon \quad (1)$$

Where: i, Ind, and t represent the firm, industry, and year, respectively.。 The dependent variable $Sale_{it}$ denotes the number of sales personnel in firm i in year t; The key explanatory variable $\ln dig_{it}$ represents the degree of digital transformation of firm i in year t; $\sum Ind$ and $\sum Year$ are industry and year fixed effects, respectively, included to absorb potential fixed-effect variations. ε is the random disturbance term.； $\sum CV_{it}$ represents a set of firm-level control variables.

3.3 Variable Definitions

Dependent Variable: Sales Personnel ($Sale$)The number of sales personnel is measured using the data reported in firms annual reports. Key Explanatory Variable: Digital Transformation Following the approach of Lu Fucai, this study adopts the digital transformation measurement index from the China Listed Companies Digital Transformation Research Database. This database systematically records detailed indicators related to the digital transformation process of listed companies, forming a comprehensive index system that assesses corporate digital transformation. The system consists of six primary indicators, each subdivided into multiple secondary indicators, covering various aspects of enterprise digitalization. This index provides a more comprehensive and in-depth assessment of firms' digital transformation levels.

The construction of this index incorporates multiple methodologies, including textual analysis of listed firms disclosures and the proportion of digital intangible assets. Additionally, it systematically standardizes firms' progress in digital strategy, technological

applications, organizational empowerment, environmental support, digital transformation outcomes, and digital application capabilities. This approach provides robust data support for the high-quality development of enterprises and relevant industries.

To mitigate the potential impact of omitted variables on estimation results, this study incorporates firm-level controls related to business operations, financial conditions, and governance structure. Drawing from the methodologies of Guan et al. (2023) and Yang et al. (2023), we include key variables that may influence corporate digital transformation. The specific control variables are as follows: R&D intensity (RDSpendSumRatio): Ratio of R&D investment to operating revenue.; Capital deepening (capdegree): Ratio of net fixed assets to the total number of employees. Firm size (Size): Natural logarithm of total assets; Earnings per share (PEpershare): Net profit attributable to common shareholders divided by the weighted average number of common shares outstanding; Ownership concentration (Top1): Shareholding ratio of the largest shareholder.; Leverage (Lev): Ratio of total liabilities to total assets.; Net profit margin (NetProfit): Ratio of net profit to revenue.

Table 1. Descriptive Statistics

Variable Name	Variable Symbol	Sample Size	Mean	Standard Deviation	Minimum Value	Maximum Value
Number of Sales Personnel	Sale	17,539	780.1	4,804	0	142,824
Digital Transformation Level	lndig	18,054	3.567	0.270	3.062	4.342
R&D Intensity	RDSpend SumRatio	16,412	8.403	229.8	0	29,256
Firm Size	Size	18,054	22.04	1.272	19.58	26.45
Leverage Ratio	Lev	18,054	0.367	0.189	0.0319	0.902
Capital Deepening	capdegree	17,988	12.34	1.215	2.915	18.29
Net Profit Margin	NetProfit	18,053	0.0903	0.169	-1.544	0.538
Shareholding Ratio of the Largest Shareholder	Top1	18,017	34.29	14.77	8.020	75.78

4. Empirical Analysis and Results

4.1Baseline Regression

Table 2 presents the baseline regression results on the impact of digital transformation on the number of sales personnel in enterprises. Column (1) includes only the key explanatory variable. Column (2) incorporates year fixed effects, industry fixed effects, and firm fixed effects into the regression model. Column (3) further adds all control variables to the model.

Table 2. Baseline Regression Analysis

	(1)	(2)	(3)
lndig	469.869***	1,081.699***	374.622***
	(12.35)	(23.73)	(4.35)
RDSpendSumRatio			-7.381**
			(-1.99)
Size			463.274***
			(10.22)
capdegree1			-195.195***
			(-6.57)
NetProfit			-518.663***
			(-3.84)
Lev			-223.418*
			(-1.67)
Top1			1.71
			(1.1)
PEpershare			77.240**
			(2.28)
Constant Term	-1,159.923***	-3,340.232***	-8,602.016***
	(-8.53)	(-20.53)	(-10.15)
Year Fixed Effects	NO	YES	YES
Industry Fixed Effects	NO	YES	YES
Firm Fixed Effects	NO	YES	YES
Sample Size	17,038	17,038	15,490
R-squared	0.009	0.186	0.338

The results indicate that the regression coefficients of digital transformation (lndig) are 469.869, 1,081.699, and 374.622 in the three models, all of which are statistically significant at the 1% confidence level. This suggests that a higher degree of digital transformation is associated with an increase in the number of sales personnel in enterprises.

Regarding the control variables, R&D intensity (RDSpendSumRatio), firm size (Size), capital deepening (capdegree), net profit margin (NetProfit), leverage ratio (Lev), and basic earnings per share (PEpershare) all exhibit significant effects on the number of sales personnel.

4.2 Robustness Tests

To ensure the robustness of the results, several tests were conducted:

First, addressing potential endogeneity concerns and considering the possible lagged effect of digitalization investments, this study lags the core explanatory variable by one period before re-estimating the model. This helps to reduce the impact of time lags on the reliability of the conclusions. The regression results, shown in Column (1) of Table 3, indicate that the estimated coefficient of enterprise digital transformation remains consistent with the baseline regression results.

Second, recognizing that different measurement methods for digital transformation may yield varying results, this study follows the approach of Yuan et al. (2021). Specifically, a corporate digital terminology dictionary was constructed, and

relevant segments from listed companies' annual reports were analyzed using text analysis to compute the frequency of digital-related terms as a proxy for corporate digitalization, denoted as . The results, presented in Column (2) of Table 3, demonstrate that even when using an alternative measurement for digital transformation, the regression results remain robust.

Third, to eliminate potential sample selection bias, this study follows the methodology of Zhao Chenyu (2023) and re-estimates the model using a subsample restricted to the period after the 2015 National People's Congress (NPC) sessions. The results, shown in Column (3) of Table 3, remain statistically significant, confirming the robustness of the findings.

Table 3 Stability Test

	(1) One-period lag	(2) Replacement explanation	(3) Part time
	Sale	Sale	Sale
Lndig			386.632***
			(3.85)
Lndig1		90.883***	
		(4.70)	
L1_dig	404.558***		
	(4.28)		
Constant Term	-8,826.638***	-7,620.752***	-8,366.137***
	(-9.56)	(-9.75)	(-9.37)
CVs, Year, Ind	YES	YES	YES
Sample Size	13,133	15,079	8,330

5. Further Analysis

5.1 Mechanism Test

This section employs a mediation effect model to examine the mechanism through which digital transformation influences the number of sales personnel. The complete mediation model is as follows:

$$Sale_{it} = \beta_0 + \beta_1 \ln dig_{it} + \sum \beta\, CV_{it} + \sum Year + \sum Ind \quad (2)$$

$$Mediator_{it} = \beta_0 + \beta_2 \ln dig_{it} + \sum \beta\, CV_{it} + \sum Year + \sum Ind + \varepsilon \quad (3)$$

$$Sale_{it} = \beta_0^{'} + \beta_3^{'} Mediator_{it} + \beta_4^{'} \ln dig_{it} + \sum \beta^{'} CV_{it} + \sum Year + \sum Ind + \varepsilon \quad (4)$$

5.1.1 Wage Effect

He and Wang (2023) found through empirical analysis that digital transformation positively influences employee wages by increasing firms' economic rents and adjusting employment skill structures. Wages, in turn, are a key determinant of the number of sales personnel[21]. To measure employee wage levels, this study uses the standardized salary growth rate (salarygrowth), with data sourced and standardized from the Common Prosperity Research Database in CSMAR. The empirical results, as shown in Column (1) of Table 3, indicate that the regression coefficient of enterprise digital transformation on salary growth is significantly positive at the 1% level, suggesting that digital transformation enhances employee wage levels.

Moreover, the regression coefficient of salary growth on the number of sales personnel is also significantly positive, implying that wage increases promote the expansion of the sales workforce. This confirms that salary growth acts as a mediating variable in the relationship between digital transformation and sales personnel growth. The Sobel test further validates this mediation mechanism, showing that the effect of salary growth as a mediator is both statistically significant and positively transmitted.

5.1.2 Corporate Operational Efficiency Effect

Karimi and Walter (2015) pointed out that digital transformation has a disruptive impact on corporate management efficiency, enabling firms to utilize existing resources more effectively, optimize the allocation of management expenses, and expand their market coverage, thereby increasing the demand for sales personnel [22].

Additionally, the study by Tang (2022) demonstrated that digital transformation drives firms to continuously adjust their internal structures. By improving management efficiency and market competitiveness, firms require more sales personnel to support market expansion and customer service [23].

Thus, digital transformation enhances overall operational efficiency through automation and data analytics tools, directly impacting firms' demand for sales personnel.

To measure corporate operational efficiency, this study uses management expenses (mfee). The empirical results, as shown in Column (2) of Table 3, confirm the significance of the operational efficiency effect. The results pass the Sobel test, indicating that the corporate operational efficiency effect is a significant and positively transmitted mediation mechanism.

Table 3. Mediation effect test

	(1)			(2)	
	Sale	salarygrowth	Sale	mfee	Sale
lndig	374.62***	6.31***	378.44***	0.02***	359.20***
		(8.39)	(4.39)	(5.46)	(4.16)
salarygrowth			0.593**		
			(1.84)		
mfee					767.30***
					2.36
Sobel Test	Mediating Variable：Salary Growth Rate			Mediating Variable：Management Expenses	

	0.213***			133.81***	
	Mechanism Valid – Positive Transmission			Mechanism Valid – Positive Transmission	
Bootstrap Analysis	0.000			0.000	
	Partial Mediation Effect			Complete Mediation Effect	
CVs, Year, Ind	YES	YES	YES	YES	YES
N	15,913	15,913	15,913	15,454	15,454

5.2 Heterogeneity Analysis

5.2.1 Regional Heterogeneity

Since the digital economy contributes to the formation of a coordinated regional economic development pattern [24], the impact of enterprise digital transformation varies across different regions. Following the classification method of Shen (2021), this study divides the sample based on firm location into Eastern, Central, and Western regions. The results are presented in Table 4. Empirical findings indicate that in the Eastern and Central regions, the impact of digital transformation on the demand for sales personnel is significant. Notably, this effect is stronger in the Central region. However, in the Western region, the impact of digital transformation on the number of sales personnel is not statistically significant. Possible explanations for these results include: In the Central region, marketization levels are lower compared to the Eastern region, and the region is still in the accelerated phase of digital infrastructure development. Traditional sales models remain dominant, meaning that enterprise digital transformation significantly enhances sales efficiency and creates more sales positions. In the Eastern region, where marketization levels and digital adoption are already high, the marginal effect of digital transformation on the number of sales personnel is relatively smaller. Enterprises undergoing digital transformation are more likely to optimize their existing sales teams and sales strategies rather than significantly increasing the number of sales personnel. Although the government has been actively promoting digital infrastructure development in the Western region, the market size remains relatively small, leading to limited demand for new sales positions.

Table 4. Regional Heterogeneity Results

	Eastern	Central	Western
lndig	270.489***	1,023.230***	352.119
	(2.82)	(2.64)	(1.46)
Constant Term	-9,080.703***	-9,183.617***	-5,957.061***
	(-9.24)	(-2.96)	(-2.81)
CVs, Year, Ind	YES	YES	YES
Sample Size	11,726	1,538	2,209

5.2.2 Factor Intensity Heterogeneity

Following the classification method of Yin et al. (2018), this study groups firms based on factor intensity into labor-intensive, technology-intensive, and asset-intensive enterprises. The results are presented in Table 5.

Empirical findings indicate that digital transformation significantly increases the number of sales personnel in labor-intensive and technology-intensive enterprises. Among them, the effect is stronger for labor-intensive enterprises.

Labor-intensive enterprises primarily rely on a large workforce for production and sales. Digital transformation, through the adoption of digital tools (such as CRM systems, data analytics, etc.), significantly improves the efficiency and performance of sales personnel. Additionally, labor-intensive enterprises face intense market competition, requiring firms to expand their market coverage by hiring more sales personnel to gain a competitive edge.

Technology-intensive enterprises offer high-value-added products, and their sales processes are more complex, necessitating sales personnel with higher technical expertise and specialized knowledge. As a result, digital transformation supports the expansion of sales teams in these firms by facilitating a more efficient and informed sales process.

However, digital transformation does not significantly impact the number of sales personnel in asset-intensive enterprises. This may be because these firms generally have a higher degree of automation, and digital transformation primarily focuses on production optimization rather than sales expansion. Their sales models remain relatively stable, with a fixed customer base, relying more on established sales channels and long-term customer relationships rather than expanding their sales teams.

Table 5. Factor Intensity Heterogeneity Results

	Labor-Intensive	Technology-Intensive	Asset-Intensive
lndig	632.312**	304.968***	228.531
	(2.45)	(3.51)	(1.08)
Constant Term	-12,032.005***	-8,183.394***	-4,618.400***
	(-5.91)	(-7.73)	(-3.45)
CVs, Year, Ind	YES	YES	YES
Sample Size	3,501	9,499	2,351

5.3 Heterogeneity in Employee Protection Disclosure

The sample is grouped based on whether a company discloses occupational health protection measures. If a company reports occupational health check-ups, occupational disease funds, occupational health investments, workplace safety

training, or states that no occupational safety incidents have occurred, it is coded as 1; otherwise, it is coded as 0.

From the perspective of firm characteristics, the disclosure of occupational health protection is an important factor influencing the impact of digital transformation on the number of sales personnel. The results are presented in Table 6.

In firms that disclose employee protection measures, the effect of digital transformation on the number of sales personnel is not significant. This may be because these firms have already established comprehensive employee protection systems, leading to higher employee satisfaction and loyalty. As a result, digital transformation primarily enhances work efficiency and methods, rather than significantly increasing the number of sales personnel.

In firms that do not disclose employee protection measures, digital transformation significantly impacts the number of sales personnel. This may be because these firms lack sufficient employee protection, and the introduction of new technologies, tools, and work methods through digital transformation significantly improves working conditions and career development prospects for sales personnel. Consequently, digital transformation either increases the number of sales personnel or reduces turnover rates in these firms.

Table 6. Disclosure of employee protection heterogeneity results

Disclosure of employee benefits	Yes	No
lndig	-961.129	321.671***
	(-0.54)	(2.65)
Constant Term	-34,783.297**	-10,935.009***
	(-2.28)	(-4.45)
CVs, Year, Ind	YES	YES
Sample Size	1,102	14,386

6. Policy Recommendations

Based on data from publicly listed companies between 2011 and 2022, this study empirically examines the impact of digital transformation on the number of sales personnel. The main conclusions are as follows:

Digital transformation significantly increases the number of sales personnel: Digital transformation has become a key driver for market expansion and management efficiency improvement, leading to a substantial increase in the demand for sales personnel. By integrating digital technologies, enterprises not only enhance overall operational efficiency but also strengthen market competitiveness, thereby increasing the need for sales personnel.

Mechanism analysis: The study identifies wage adjustments and management efficiency improvements as the two primary channels through which digital transformation contributes to the growth in the number of sales personnel.

Heterogeneity analysis: The effect of digital transformation varies across different types of enterprises and regions. The impact is more pronounced in high-tech firms, technology-intensive enterprises, and companies in the central and western regions of China. This indicates that digital transformation has differentiated effects depending on the context, and enterprises should tailor their digital transformation strategies according to their specific characteristics and regional conditions.

These findings provide valuable insights for various stakeholders in the labor market, leading to the following policy recommendations:

6.1 Government Initiatives

The government should further promote the widespread adoption of digital technologies across industries through policy support and financial subsidies, encouraging enterprises to embrace digital transformation and improve the overall digitalization level of the economy. This would not only enhance corporate competitiveness but also create more employment opportunities and career development prospects for sales personnel. Additionally, the government and industry associations should actively build platforms to facilitate collaboration and knowledge-sharing among enterprises, enabling them to exchange best practices and successful experiences in digital transformation. Furthermore, the government should enhance public employment services to help workers and businesses better navigate structural unemployment challenges. Measures could include: Offering public digital skills training programs to improve workforce digital literacy and employability. Subsidizing enterprises to establish training funds and conduct digital skills training, ensuring smooth workforce transitions and reducing unemployment risks.

6.2 Corporate Strategies

Enterprises should optimize their compensation and incentive structures in line with digital transformation needs. This can be achieved by: Raising base salaries, introducing performance-based bonuses, and establishing long-term incentive plans to increase employee motivation and loyalty. A well-structured compensation system not only attracts high-caliber sales talent but also reduces turnover rates, thereby enhancing

corporate stability. Additionally, firms should prioritize digital skills training for sales personnel. Providing structured training programs and career development pathways will improve digital capabilities and self-management skills, ensuring that sales teams can effectively leverage digital tools in their work.

6.3 Sales Personnel Development

In the digital economy, technological and market environments evolve rapidly. Sales personnel should: Continuously update their knowledge and skills to remain competitive. Develop adaptability and flexibility to navigate the changes in work patterns and business models brought about by digital transformation. Moreover, sales professionals can leverage digital platforms such as online learning platforms, professional networking sites, and industry-specific forums to: Access the latest industry trends and educational resources. Explore new career opportunities and enhance professional competencies. By actively embracing digital transformation, sales personnel can maximize career growth and long-term success in the evolving digital economy.

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