Digital Infrastructure and the Reshaping of Labor Mobility: A Regional Economic Analysis of the "East Data West Computing" Initiative

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Abstract. The "East Data, West Computing" (EDWC) initiative represents a landmark in China's digital infrastructure strategy, aiming to redistribute computing capacity and foster balanced regional development. While prior research has emphasized industrial and energy outcomes, its impact on labor mobility remains underexplored. This paper examines how EDWC shapes interregional labor flows, treating key receiving regions as the treatment group and others as controls. Building on infrastructure and migration literature, it proposes three mechanisms—lowering information and matching costs, fostering industrial clusters, and narrowing regional disparities—through which digital infrastructure may influence population movements. The study expands existing debates from traditional transportation infrastructure to digital networks, offering empirical evidence and policy insights into how large-scale digital infrastructure projects reshape labor allocation and regional economic dynamics.

Keywords: digital infrastructure, East Data West Computing, labor mobility, regional development, industrial clusters

1. Introduction

In the post-pandemic era, the digital economy is a driver of China's development. As a component of national strategic infrastructure, digital infrastructure deployment is reshaping regional economies and resource allocation. The "East Data, West Computing" project marks a shift from fragmented to coordinated planning. Its goal is to build western computing centers so that data and computing power flow between East and West, optimizing resources and promoting coordinated development [1].

Existing research has focused on computing, energy, and digital industries, with limited attention paid to its effects on labor mobility [2]. Digital infrastructure brings large investments and industry clusters, which in turn may attract population inflows and create employment opportunities in target regions. This raises questions: do western regions attract more labor, and does digital infrastructure induce labor reallocation similar to transportation infrastructure? Empirical evidence is lacking.

This paper examines how East Data, West Computing affects interregional labor flows. Key receiving regions are treated as the treatment group and others as controls; we compare net labor

inflows before and after the policy to identify its causal effect on labor mobility. It expands research on infrastructure's impact on population allocation by including digital infrastructure and provides empirical data and policy insights for evaluating the effectiveness of the EDWC project and guiding the formulation of regional labor policies.

2. Literature review

Recent research has increasingly highlighted the critical role of infrastructure in shaping regional economic development and labor mobility. Infrastructure is generally regarded as a key external factor affecting labor migration and the spatial distribution of the population. Different types of infrastructure can lower migration costs, enhance regional attractiveness, and reshape economic space [3]. As the digital economy rises, digital infrastructure has become a new focus. However, the relationship between digital infrastructure and labor mobility remains underexplored and lacks systematic analysis.

A large body of empirical work has demonstrated that traditional infrastructure strongly promotes labor movement. For example, improved transportation networks reduce commuting and migration costs, thereby increasing a region's ability to attract workers. Duranton and Turner estimate that a 10% increase in a city's highway stock raises its employment by about 1.5% over 20 years [4]. In other words, expanding highway infrastructure significantly contributes to urban economic growth. Similarly, Donaldson uses India's colonial railroad expansion as a quasi-experiment and finds that railroads reduced trade costs, increased trade flows, and raised real incomes in connected regions [5]. In short, improved highways and railways make migration easier and stimulate economic activity, providing solid empirical evidence on how infrastructure shapes population distribution. Notably, most of these studies focus on traditional transportation or energy infrastructure, with little attention devoted to the newer information and digital infrastructures enabled by the digital era..

With the spread of the Internet and big data, scholars have shifted attention to how digital infrastructure affects economic outcomes. Forman et al. have shown that advanced digital networks and broadband connections significantly raised productivity and output [6]. For instance, cross-country analysis finds a robust positive link between broadband availability and GDP growth. Czernich et al. report that a ten percentage-point increase in broadband penetration boosts annual per-capita GDP growth by roughly 0.9–1.5 percentage points [7]. In China, some studies suggest that investing in digital infrastructure can help narrow regional development gaps and encourage the flow of production factors toward central and western regions. These findings provide preliminary evidence that digital infrastructure spurs productivity and economic convergence.

However, much of this research focuses on aggregate outcomes like industrial upgrading or macro growth, and it rarely examines how digital infrastructure affects jobs and labor migration. In other words, existing literature often treats population flows as a secondary effect of growth, without directly studying the mechanisms of how new digital networks create jobs or attract talent across regions. For example, the "Eastern Data–Western Computation" (EDWC) initiative in China is a major digital infrastructure project intended to balance data-processing capacity between east and west. Recent studies of EDWC have mostly examined its impact on industry structure, energy efficiency, and carbon emissions. Only a few qualitative analyses suggest EDWC could foster digital industry clustering and job growth in the western regions, but these remain at the conceptual level. To date, no systematic empirical framework has been developed to analyze how EDWC influences labor flows or regional population changes.

The Eastern Data–Western Computation initiative is a Chinese government project that routes data from eastern industries to be processed in western data centers. This aims to leverage the West's

abundant renewable energy and land resources to handle the computing needs of the East, promoting collaborative development. Although scholars are discussing EDWC, most research is in the early stage [8]. Prior work emphasizes its effects on inter-regional industrial specialization and on green computing, leaving a significant gap in understanding its social impacts, particularly its role in driving labor mobility or population redistribution across China's regions [9,10]. This represents an important open question for Chinese-context policy analysis.

In summary, existing literature has amassed rich evidence on infrastructure's role in regional development and labor migration, but three key gaps remain:

Emphasis on traditional infrastructure: Research has concentrated on roads, highways, railways, and energy, with few direct tests of digital infrastructure's effect on labor mobility. Digital networks may work differently than physical infrastructure in shaping migration patterns. Mechanisms of digital infrastructure: There is a lack of studies on how digital infrastructure affects the labor market through specific channels (e.g. job creation, new digital services, talent attraction). Most work looks at aggregate growth rather than employment and migration. Case of China's EDWC project: The EDWC initiative is a unique case of large-scale digital infrastructure in China, yet no systematic empirical study has been conducted to assess its impact on regional labor flows.

This literature review builds on the above findings, further synthesizing existing research and outlining possible directions for future studies. These include examining the labor-market effects of digital infrastructure upgrades and empirically assessing how China's EDWC project influences workforce migration.

3. Theoretical framework and hypotheses

Although a systematic theoretical model linking digital infrastructure to labor mobility has not yet been fully established, the existing literature provides valuable insights into potential explanatory mechanisms. Broadly, digital infrastructure may influence the spatial allocation of labor through three primary channels, as outlined below.

3.1. Reducing information and matching costs

Digital infrastructure can significantly improve the speed and reliability of information transmission across regions, thereby alleviating information asymmetries in regional labor markets. Stable, high-capacity computing and network conditions facilitate remote collaboration, online work, and cross-regional recruitment, ultimately enhancing the efficiency of job matching [11]. This suggests that digital infrastructure not only supports data flows but may also reduce the geographic constraints associated with employment opportunities.

3.2. Promoting industrial clusters and job creation

The establishment of data hubs and digital industry parks often generates clustering effects among upstream and downstream enterprises. Kosfeld and Mitze demonstrate that industrial agglomeration fosters productivity spillovers and knowledge diffusion, which in turn expands labor demand and improves job quality [12]. Thus, while advancing emerging industries, digital infrastructure may simultaneously serve as a powerful force attracting labor inflows.

3.3. Narrowing regional disparities and improving living conditions

Investment in digital infrastructure is also considered an effective tool for reducing regional inequalities. By enhancing public services and the quality of life in central and western regions, digital infrastructure may lessen disparities in wages and living standards between the east and west. This could lower migration barriers and increase the willingness of workers to relocate to less-developed regions [13].

Summary and Research Directions

In sum, the literature outlines a potential "digital infrastructure–industrial development–labor mobility" logical chain. Yet these mechanisms remain largely speculative and have not been systematically tested with empirical data. Existing studies are often confined to conceptual reasoning or policy interpretation, lacking micro-level or region-specific evidence. Future research could address several key questions:

·Does digital infrastructure significantly reshape patterns of interregional labor mobility?

·Do high-skilled and low-skilled workers respond differently to such changes?

·Does industrial agglomeration mediate the relationship between digital infrastructure and labor mobility?

·Does the regional foundation of the digital economy moderate the labor effects of digital infrastructure?

4. Methodological perspectives and research outlook

Existing literature has used cross-country comparisons, regional panel regressions, and quasi-natural experiments in exploring the relationship between infrastructure and labor mobility. For example, Donaldson identifies the causal effect of transportation infrastructure on population migration using a quasi-natural experiment of railroad construction, while Duranton and Turner analyze the impact of transportation infrastructure on population distribution and economic activity allocation through cross-city differences in road density. These research approaches provide useful insights for identifying policy shocks.

However, there are still obvious deficiencies at the methodological level in the study of digital infrastructure and labor mobility: labor mobility data often rely on census or sample surveys, which are not sufficiently time-sensitive and regionally fine-grained to capture the short-term and micro effects brought about by digital infrastructures. Meanwhile, the metrics of digital infrastructure have not yet been unified, and scholars often use broadband penetration rate, the number of Internet users, or the scale of investment as substitutes, lacking variables that better reflect the characteristics of "east counts, west counts," such as computing resources and the layout of data centers. In addition, existing studies tend to stay at macro-level correlation analysis, lacking rigorous econometric tests for mediating mechanisms (e.g., industrial agglomeration, job creation). Therefore, it is necessary for future research to make the following methodological explorations: The quasi-natural experimental design can be adopted, for example, relying on the batch implementation characteristics of the "Counting East, Counting West" policy, which offers the possibility of causal identification; in terms of data sources, more reliance should be placed on big data platforms, such as Baidu Migration, social media recruitment data, etc., and be combined with official statistics, in order to improve the accuracy of labor mobility indicators. In order to improve the accuracy of labor mobility indicators; in terms of analysis dimensions, not only should we focus on the inter-provincial level, but we should also go deeper into the local and municipal levels and even the

enterprise and individual levels. This allows for an examination of differences in the impact of digital infrastructure on labor forces with different skill structures.

Through these improvements, academics can more systematically test the mechanism of digital infrastructure on the allocation of demographic factors and provide empirical support for the evaluating the performance of strategic policies such as "Count East, Count West". This section details the identification strategy, data sources and variable definitions, as well as the setting of the baseline econometric model, aiming to provide a rigorous framework for the subsequent empirical analysis.

5. Conclusion

Focusing on the research lineage of infrastructure and labor mobility, this paper systematically organizes relevant academic findings and highlights the emerging role of digital infrastructure in reshaping regional development patterns. Established studies have fully revealed the positive impacts of traditional transportation and energy infrastructures on population migration and coordinated regional development, while recent literature has gradually shifted focus to the role of digital infrastructure in driving productivity growth, industrial structure optimization, and regional balanced development. However, the existing literature on the direct link between digital infrastructure and labor mobility is still significantly deficient.

On the one hand, research still focuses on the level of macroeconomic performance and industrial upgrading, and lacks a systematic analysis of the allocation of demographic factors. On the other hand, the few literatures that deal with employment and talent attraction mostly remain speculative arguments and lack rigorous empirical tests. Especially in the Chinese context, the implementation of policy projects such as "Counting East, Counting West" provides a natural research opportunity to explore the impact of digital infrastructure on the spatial mobility of labor, but the relevant academic results are still extremely limited.

Future research can be carried out in the following directions: in terms of empirical identification, using the phased implementation of policies such as "counting from the east to the west", combined with quasi-natural experiments, we can examine in depth the causal effect of digital infrastructure on the net inflow of labor in the region. The mechanism validation system is used to test the specific mechanisms of digital infrastructure affecting population mobility through job creation, industrial agglomeration, information matching and living environment improvement. In the heterogeneity analysis, attention is paid to the differentiated responses of different types of labor (high skill vs. low skill) and different regional bases (developed vs. backward areas of digital economy). Finally, on data innovation combines big data migration information, job board data and official statistics to improve the ability to capture the dynamics of population mobility and employment changes.

Overall, digital infrastructure is not only a new power engine for economic development, but also may serve as a critical factor in reshaping the spatial pattern of population distribution. Through in-depth research on this topic, academics can theoretically expand the cross-disciplinary dialogue between labor economics and regional economics, and practically provide more solid empirical support for policies related to regional coordinated development and the "Digital China" strategy.

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