Relying on Public Talent: Regional Competitiveness and Technology Adoption in Mexico

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1. Summary

This study analyzes the impact of regional talent on trade integration and technology adoption in Mexico, measured as management skills of private and public sectors jointly. By examining the variations in management capabilities across different municipalities following the World Management Survey (WMS) scoring grid, this research seeks to uncover how managerial talent influence exposure to trade, foreign direct investment (FDI), and innovative initiatives. We construct a municipal talent measure using microdata of the National Survey on Productivity and Competitiveness of Micro, Small, and Medium-Sized Enterprises (ENAPROCE), that contains data of 28,709 Mexican firms, and the National Survey of Municipal Governments (ENGMDT 2017), with governance and administrative information from 2,458 local municipalities. We identify a significant effect of public-private management skills on technology adoption, measured by firms' intellectual property registration, among other variables related to innovation, trade and investment. For instance, preliminary results show a robust relationship between intellectual property registration and firm's management score, in the manufacturing and services sectors alike. We find that an increase of one standard deviation of management score could add 0.10 registries in the year 2016 and 2017, whereas the average was 0.23. The relationship between intellectual property and public management capabilities score has an additional potential impact on IP registrations which is about than the internal practices. Using the National Survey of

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Occupation and Employment (ENOE) we investigate which professions have the most impact on municipal talent score to provide policy recommendations.

Finally, we investigate different measures of the joint public-private management skills to offer complementary explanations of two novel contributions to growth theory and trade: (i) the Economic Complexity Index (ECI) proposed by Hidalgo (2021) as a foreteller of economic, and (ii) Melitz (2003) that provides a theory of intra-industry reallocations, industry productivity and regional competitiveness. We explore if the joint public-private talent measure is a good predictor of economic complexity and regional competitiveness, and whether STEM fields play a significant role.

a. Management, economic complexity, and trade: An overview of the literature

Effective management practices play a pivotal role in driving economic performance, particularly in the context of global trade integration and economic complexity. For instance, Bloom et al. (2022) examine how management practices across Mexican firms contribute to significant variations in productivity, with a particular focus on the role of misallocation of resources. This study reveals that better-managed firms allocate resources more efficiently, leading to higher productivity and growth. Specifically, structured management practices, such as systematic data collection and the use of performance incentives, are associated with increased profitability, innovation, and firm size. These findings emphasize the importance of management in reducing regional disparities and enhancing broader economic integration.

Giorcelli (2019) investigates the long-term effects of management training and technology transfers on firm performance, using historical data from Italy's post-World War II productivity programs. The study finds that firms receiving both management training and technology transfers experienced sustained improvements in productivity, employment, and sales over a fifteen-year period. This research highlights the complementarity between management skills and technology in driving firm success, suggesting that management improvements are essential for fully leveraging technological advancements.

Bruhn et al. (2018) provide further evidence from a randomized controlled trial on the impact of management consulting services on small and medium enterprises (SMEs) in Mexico.

Their findings show that firms receiving consulting services saw significant, lasting improvements in productivity, quality, and efficiency. These results emphasize the critical role of effective management practices in enhancing firm performance and contributing to broader economic outcomes.

Moreover, Bloom & Van Reenen (2010) explore the significant disparities in management practices across firms and countries, emphasizing how these disparities impact productivity and economic performance. They identify factors such as market competition, ownership structures, and labor regulations as key determinants of management quality. In Mexico, where public and private sectors exhibit stark contrasts in management effectiveness, these differences can significantly influence regional economic complexity and integration into global trade networks. The study suggests that enhancing management practices could be a crucial lever for enhancing economic outcomes at the subnational level.

On the public side, Acemoglu et al. (2015) study the effect of state capacity of Colombian municipalities on public goods provision and its impact on prosperity considering spillover effects. They conceptualize "state capacity" as the presence of state functionaries and agencies since local state capacity determined at the local level, for instance, services to businesses (notary offices, deed registry offices and tax collection offices), health services (health centers and posts), education services (schools and libraries), public safety services (fire stations and jails). In their model, local and national state capacity are a network game in which each municipality invests in local state capacity, where spillovers created by other municipalities and the decisions of the national government generated. Their estimates indicate that the spillover effect of public good provision is considerable, explaining almost half of the overall impact on economic prosperity, and offering a new rationale on why regional disparities' origin and prevalence.

Building on this, Rodríguez-Pueblita (2024) investigates regional productivity disparities by integrating concepts from managerial economics, development economics, and political economy. Utilizing data from Mexican firms and local governments, he links firm productivity to both internal and external management practices, applying the concept of management as technology á la Bloom. This research shows that effective management practices at both the firm and government levels significantly boost productivity. It also

addresses potential endogeneity issues, revealing a strong link between private management practices and the quality of public goods. Additionally, the study highlights technology adoption as an indirect mechanism contributing to regional productivity differences.

Hidalgo (2021) delves into the foundational theory and practical applications of economic complexity, highlighting its significance in understanding a country's productive capabilities and economic development. By conceptualizing economies as networks of interrelated productive knowledge, the paper illustrates how countries with higher economic complexity tend to achieve greater diversification and resilience in global markets. The discussion on the role of institutions and human capital in driving economic complexity provides a framework for understanding how management skill gaps between public and private sectors in Mexico could impact the country's ability to integrate into global trade networks and develop sophisticated economic activities at the subnational level.

Finally, in his seminal paper, Melitz (2003) provides a theoretical framework demonstrating how trade liberalization leads to intra-industry reallocations, where more productive firms expand, and less productive ones exit the market, thereby enhancing overall industry productivity and competitiveness. This model suggests that regions with more effective management practices, often found in the private sector, are likely to benefit more from trade integration, as they can better adapt to competitive global markets. This underscores the importance of addressing public-private management skill gaps to ensure that all regions can leverage trade liberalization for economic growth and complexity.

b. Research hypotheses on the impact of management capabilities on economic complexity and trade integration

Considering the literature on the interrelationship between management capabilities, economic complexity, and exposure to trade, the following research hypotheses will guide the empirical analysis. By testing these hypotheses, the study aims to deepen our understanding of how talent measured as management skills contribute to disparities in economic performance and global market participation at the subnational level:

- Hypothesis 1: Management capabilities in private and public sector affect productivity simultaneously, consequently affecting the *know how* measured by economic complexity, thus determining regional integration into global markets.
- Hypothesis 2: Gaps between private and public in management effectiveness negatively affect local productivity, although gaps reduce across time due to inter-regional allocation. The sector with the lowest management capabilities tends to dominate.
- Hypothesis 3: The higher the presence of STEM professionals are the higher private and public management capabilities are, reflecting that there are spillover effects that explain the levels of regional economic sophistication and participation in global markets.

If these hypotheses are validated, it would indicate that improving management practices, particularly within the public sector, could be a key approach to enhancing regional economic outcomes and promoting more balanced participation in global trade. This finding could guide targeted management interventions aimed at reducing disparities and strengthening Mexico's position in the international market.

2. Statement of relevance

The proposed research project is highly relevant to the current economic landscape in Mexico, where disparities in regional economic performance, integration into global trade networks, and levels of economic complexity persist (Aleman-Castilla & Rodríguez-Pueblita, 2023). These disparities can be traced, in part, to differences in management practices. By investigating the role of public-private management skill gaps on subnational trade integration and economic complexity, this study aims to provide critical insights that are not only academically valuable but also directly applicable to policy-making and economic development strategies.

a. Importance of understanding joint management skill

Management practices play a pivotal role in shaping firm productivity, resource allocation, and overall economic outcomes. In Mexico, significant disparities exist between the management capabilities of the public and private sectors. These disparities may have far-

reaching implications for regional development, as they influence how resources are allocated, how effectively firms operate, and how regions engage with global markets.

As exposed above, previous studies have established that effective management practices are critical for enhancing productivity and driving economic growth. However, there is a notable gap in the literature regarding how management skill gaps between the public and private sectors influence economic complexity and trade integration. This research aims to fill that gap by providing empirical evidence on the impact of these disparities on regional economic outcomes in Mexico.

b. Relevance to economic complexity and trade integration

Economic complexity and trade integration are critical factors in a country's economic development. The ECI has been widely used to measure the sophistication of an economy's productive capabilities. Regions with higher economic complexity are typically more diversified and resilient, with a greater ability to adapt to global market changes. Trade integration, on the other hand, allows regions to leverage their economic competitive advantages on a global scale, enhancing growth prospects and reducing poverty (Aleman-Castilla & Rodríguez-Pueblita, 2023).

In Mexico, there are significant regional disparities in both economic complexity and trade integration. Some regions, particularly those with strong private sector management practices, have successfully integrated into global markets and developed complex economic activities. In contrast, other regions, where public sector management practices dominate, lag in both complexity and integration. This study is particularly relevant in this context, as it seeks to explore how management skill gaps between the public and private sectors contribute to these disparities.

c. Policy implications and potential impact

The findings from this research will be directly relevant to policy formulation in Mexico. One of the key policy implications is the need for targeted management interventions in the public sector. If the hypotheses of this study are confirmed, it would suggest that improving

public sector management practices could be a crucial tool for enhancing regional economic outcomes and promoting more equitable participation in global trade.

Policy-makers could use these insights to design or promote programs that focus on management training and development for public sector officials, aimed at closing the management skill gap with the private sector. Such programs could be integrated into broader economic development strategies that seek to enhance economic complexity and trade integration across all regions of Mexico.

d. Contribution to academic literature

In addition to its practical implications, this research will make a significant contribution to the academic literature on economic development, management, and trade. While there is a growing body of work on the importance of management practices for firm performance, much of this research has focused on the private sector in isolation. This study, by contrast, takes a more holistic approach, considering how public sector management practices interact with those in the private sector to influence regional economic outcomes.

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