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Gender Diversity and Firm Innovation in Post-Communist Economies

This policy brief examines how gender diversity in key organizational positions—owners and employees—affects firm innovation outcomes in post-communist economies. Utilizing Business Environment and Enterprise Performance Survey (BEEPS) data, we analyze the impact of gender diversity through the Doing-Using-Interacting innovation framework. Our findings suggest that gender diversity enhances innovation through two primary channels: managerial practices (Doing) and technology adoption (Using). Policymakers and business leaders in post-communist settings must recognize these pathways and develop strategies to harness the benefits of diversity-driven innovation.



Why Gender Diversity Matters

Gender diversity has emerged as a crucial factor in shaping organizational innovation and performance. Previous research has highlighted the significant role of gender in managerial practices and decision-making processes and demonstrated that a balanced gender composition, particularly in leadership roles, positively impacts an enterprise's performance (Ruiz-Jiménez and Fuentes-Fuentes, 2016; Tonoyan and Boudreaux, 2023). Gender diversity can enhance problem recognition and problem-solving capabilities, which are critical for innovation. Moreover, gender-diverse teams exhibit superior decision-making, creativity, and adaptability, which contribute to the development of innovative products and strategies (Tonoyan, Boudreaux, 2023; Østergaard et al., 2011). Conversely, homogeneous teams often suffer from limited idea generation, weaker interpersonal dynamics, and lack of constructive conflict, leading to missed opportunities for innovation. However, the impact of gender diversity on innovation is not uniformly positive and depends on how diversity is managed within organizations. Factors such as industry type, organizational culture, team dynamics, and institutional context influence whether gender diversity enhances or hinders innovation (Joshi et al., 2015, Machokoto et al., 2020).

Recently, a sizable literature has been devoted to understanding the role of gender diversity as an innovation driver in emerging economies, where firm innovation remains lower than in advanced economies (Chkir et al., 2021), and gender diversity practices differ from those in the developed world. In particular, research has established that also in emerging economies firms with gender-diverse ownership or top management demonstrate higher innovation output and that the impact of gender diversity on innovation is stronger in less-advanced emerging economies (Machokoto et al., 2023, Tonoyan, Boudreaux, 2023). As concerns the impact of

gender diversity among employees the results on innovation in an emerging country context have been mixed (see e.g., Na and Shin, 2019 and Madison, et al., 2022). However, the empirical channels through which gender diversity influences innovation in emerging economies are still not well understood.

This brief contributes to this understanding in the particular context of post-communist economies. It examines the impact of gender diversity on innovation within a DUI (learning-by-doing, by-using, and by-interacting) framework. This framework, introduced by Jensen et al. (2007), highlights the critical role of experiential and interaction-based learning in fostering innovation, and is particularly relevant in contexts with limited R&D resources, such as post-communist economies.

Our results show that gender diversity enhances innovation by strengthening learning-by-doing and learning-by-using processes. These insights can help shape policies and workplace strategies that promote gender equality and, in turn, foster innovation in these economies.

DUI and Gender Diversity

Traditionally, innovation has been closely linked to the STI (Science, Technology, and Innovation) framework. The STI mode emphasizes that innovation is driven by science and technology and is based on R&D, scientific human capital that increases a company's absorptive capacity, research infrastructure, and connections with scientific partners. Instead, the Doing-Using-Interacting (DUI) mode is based on non-scientific innovation drivers including practice, experience, experimentation, specialization in production, product customization, interaction and network. The DUI mode refers to the exchange of experiences and know-how that involve a large component of tacit knowledge. It is particularly relevant in contexts with limited R&D resources, such as post-communist economies, where practical and collaborative approaches are essential for innovation.



We argue that gender diversity within organizations can significantly enhance the DUI drivers of innovation by introducing varied perspectives, experiences, and collaborative dynamics. **Learning-by-doing** involves acquiring knowledge and skills through hands-on experience, routines, and iterative problem-solving in daily work activities. Gender-diverse teams can contribute to this process by offering a wider range of practical insights and approaches. **Learning-by-using** driver focuses on the utilization and adaptation of technologies, machines, and equipment, as well as analyzing user feedback and customizing products to meet diverse needs. Gender diversity may enhance this aspect by integrating varied user experiences and preferences into the innovation process. Women and men may bring different insights into how technologies are used and adapted, leading to more comprehensive analyses of user needs and improved product development strategies. **Learning-by-interacting** occurs through communication among supply chain actors. Innovation can also be a result of interactions, networks, informal relationships and organizational collaborations within and between organizations. Gender-diverse teams are better equipped to build inclusive relationships and foster trust within these networks. Varied communication styles and interpersonal dynamics enhance collaborative problem-solving and knowledge exchange. Diversity not only facilitates stronger connections with external stakeholders but also improves internal coordination, making organizations more adaptable and innovative.

The Relevance of DUI in Post-Communist Economies

Post-communist economies share a common institutional history of centrally planned systems, which shaped their innovation landscapes. The collapse of the Soviet Union triggered major economic, social, and technological transformations. While the Soviet model had a

strong science and technology sector, it prioritized large-scale projects over market-driven innovation. Its linear innovation model focused on R&D but overlooked user needs, market dynamics, and interactive learning.

During the transition, these economies faced significant challenges, including limited financial capital, weak innovation management, and outdated technology. However, they retained a highly educated workforce, which became a key asset for innovation. Many post-communist economies now operate behind the technology frontier and rely heavily on imported technologies, making it essential to adopt innovation models that emphasize practical, collaborative learning over traditional R&D investments (Apanasovich et al., 2016; Marozau et al., 2021).

Most in-country analyses on modes of innovation have primarily focused on developed market economies. However, a study on Belarus (Apanasovich et al., 2016) found that the DUI mode is more effective than the STI mode in generating product innovation. This suggests that firms in post-communist economies may benefit more from hands-on, experience-based innovation than R&D-driven strategies. In this context, the DUI mode of innovation thus plays a crucial role by facilitating technology adoption, adaptation, and productivity growth. Gender diversity, in turn, may further enhance the effectiveness of the DUI drivers, as argued above.

Data and Method

Our analysis is based on a dataset of 2,871 enterprises across 22 post-communist countries from BEEPS (EBRD, 2020). BEEPS is one of the most comprehensive firm-level datasets available for post-communist economies, providing rich information on innovation, gender diversity, and institutional constraints.

The study utilizes generalized structural regression models with an ordinal output variable to assess the relationships between gender

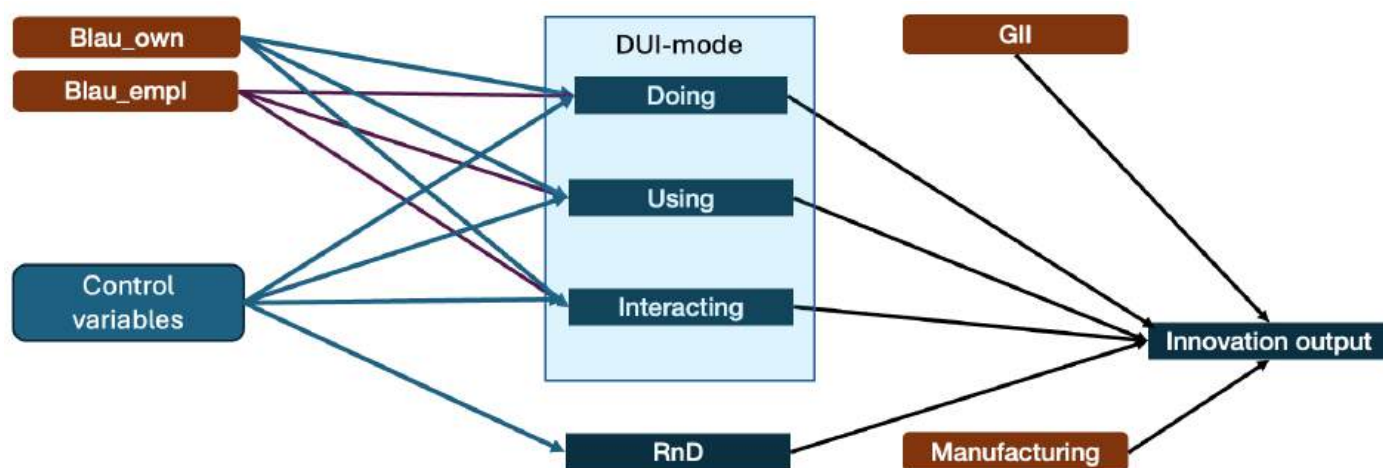


diversity, DUI drivers, R&D activities, and product innovation (see Figure 1). Innovation output is categorized by novelty as; no innovation (0), new-to-firm innovation (1), or new-to-market innovation (2). The indicators of DUI drivers used in the empirical specification follow Alhusen et al. (2021) and Apanasovich (2016). In particular, *Doing* represents managerial practices, including performance monitoring, employee awareness of production targets, performance-based incentives, strategic planning, and quality certifications. *Using* captures firms' investments in innovation-enabling resources, such as purchasing new or

upgraded machinery, licensing foreign technologies, and implementing formal employee training programs. *Interacting* reflects the extent of collaboration with external partners, including business memberships, trade associations, supplier relationships, and managerial stakeholder meetings.

We also consider R&D activities (RnD), measured through expenditures on acquiring external knowledge, in-house research and development, and contracted R&D engagements. Additionally,

Figure 1. Generalized structural equation model



gender diversity is incorporated as a key explanatory variable, using the Blau index (Blau, 1977; Tonoyan & Boudreaux, 2023) to measure diversity in firm ownership (Blau_owners) and workforce composition (Blau_empl), where 0 indicates no diversity and 0.5 represents a balanced gender representation. These two variables were incorporated one by one (Model 1 and Model 2) and together (Model 3).

Our control variables include enterprise age (lnAge), firm size (lnSize), employee education levels (Univ_degree), foreign direct investment (FDI), CEO experience (LnCEO_experience), and whether the enterprise operates in the manufacturing sector. The Global Innovation Index (GII) score is used to account for the broader national innovation environment.

Results

The results of our empirical analysis are provided in Table 1 below.

The DUI drivers and the explicit R&D measure consistently show a positive and statistically significant relationship with innovation output. Gender diversity significantly enhances the DUI drivers that fuel innovation. Ownership diversity positively influences the Using driver by promoting technology adoption and employee training. Workforce diversity strengthens the Doing driver by improving managerial practices, such as performance monitoring and quality assurance. This suggests that a gender diverse workforce is better equipped to absorb, integrate, and apply knowledge – enhancing creativity and



problem solving – ultimately fostering a more innovative work environment.

Table 1. Structural Regression Model Results

Indicator	Model 1	Model 2	Model 3
Innovation Output			
<i>Doing</i>	.06***	.06***	.06***
<i>Using</i>	.24***	.24***	.24***
<i>Interacting</i>	.09**	.09**	.09**
<i>RnD</i>	.30***	.30***	.30***
<i>Manufacturing</i>	.17***	.17***	.17***
<i>lnGII</i>	-.87***	-.88***	-.88***
Doing			
<i>FDI</i>	.98***	.91***	.91***
<i>LnCEO_experience</i>	.09	.12	.12
<i>Univ_degree</i>	.01	-.01	-.01
<i>LnSize</i>	.28***	.27***	.27***
<i>lnAge</i>	.26***	.24***	.24***
<i>Blau_owners</i>	.36		.32
<i>Blau_empl</i>		2.06***	2.05***
Using			
<i>FDI</i>	.48***	.46***	.47***
<i>LnCEO_experience</i>	.11***	.12***	.11**
<i>Univ_degree</i>	.01	.01	.01
<i>LnSize</i>	.20***	.19***	.20***
<i>lnAge</i>	.07*	.08*	.07*
<i>Blau_owners</i>	.54***	.	.53***
<i>Blau_empl</i>		.08	.07
Interacting			
<i>FDI</i>	.11**	.11**	.11**
<i>LnCEO_experience</i>	.09***	.09***	.09***
<i>Univ_degree</i>	-.01***	-.01***	-.01***
<i>LnSize</i>	-.03	-.03	-.03
<i>lnAge</i>	.11***	.11***	.11***
<i>Blau_owners</i>	-.05		-.05
<i>Blau_empl</i>		-.07	-.07
RnD			
<i>FDI</i>	.16***	.16***	.16***
<i>LnCEO_experience</i>	.01	.01	.01
<i>Univ_degree</i>	.01***	.01***	.01***
<i>LnSize</i>	.13***	.13***	.13***
<i>lnAge</i>	0.7**	0.7**	0.7**

Additionally, our results indicate that larger and older firms, as well as those with foreign equity exhibit higher levels of DUI activity, underscoring

also the role of organizational characteristics for innovation.

Conclusion

This policy brief highlights the role of gender diversity for firm innovation in post-communist economies. Our findings indicate that gender diversity enhances key innovation processes through the DUI drivers. Specifically, workforce diversity strengthens managerial practices (Doing), while ownership diversity promotes technology adoption and employee training (Using). These insights suggest that gender diversity indirectly contributes to innovation by improving decision-making, knowledge absorption, and organizational learning. By implementing policies that support inclusive leadership and workforce development, post-communist economies can unlock the potential of diverse teams, strengthening their competitiveness and innovation capacity in the global market.

Workforce development initiatives should focus on offering leadership and innovation training to diversify teams. To create gender equal opportunities, family-friendly workplace policies, such as childcare support and flexible work hours, could be implemented. Mentorship programs could also enhance women’s representation at decision-making levels. Importantly, policies in post-communist economies should go beyond traditional R&D approaches by fostering experiential and interaction-based learning and promoting teamwork practices that leverage diverse perspectives to maximize the impact of diversity on innovation

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