



Let Us Halt the Resurgence of Protectionism: Trade Openness, Innovation Ecosystem, and Workforce Diversity in the Knowledge-Based Economy

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Abstract

Protectionist economies impede the free flow of capital and labor across national and corporate borders, which limits the production, access, and diffusion of knowledge required to create novel solutions. However, further investigation is needed into the knowledge and innovation pathways/mechanisms to stop or at least reduce protectionist trade policies in order to stimulate the innovation ecosystem and develop a diverse workforce. Through a sequential mediation of venture capital and collaborations, our study investigates the relationship between trade openness and workforce diversity by adopting the knowledge-based view and building on the four pillars of the knowledge-based economy. Utilizing archived data, our analysis verified this connection. The theoretical and practical implications are also discussed.

Keywords Trade openness · Workforce diversity · Innovation ecosystem · Knowledge-based view

1 Introduction

Protectionism does not generally work as a weapon for macroeconomic stimulation (Barattieri et al., 2021), and as a result, international business research should pay more attention to it (Ghauri et al., 2021). This is more needed in the context of strategic agility in international business (Christofi et al., 2021; Tarba et al., 2023) and during the times of global pandemic which has accelerated the rate at which the globalization consensus is being defied (Delios et al., 2021). While protectionism is on the rise (Alon & Kim, 2022) and, at best, attractive, with a negligible short-term positive impact on countries' trade balances, it has negative long-term repercussions on the global tariff (Kutlina-Dimitrova & Lakatos, 2017). Protectionist nations run

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the risk of receiving retaliatory responses from other nations, which would hurt the world trade market (Li & Whalley, 2020).

As globalization skepticism causes a significant qualitative shift in strategies, structures, and behaviors that can be seen in international business, several studies have documented how protectionist tendencies affect domestic country innovation and productivity (Akcigit et al., 2018; Witt, 2019; Buckley & Hashai, 2020; Cuervo-Cazurra et al., 2020). The previous literature on protectionism has largely focused on the macro (economic) effects of how national trade policies support national economic prosperity. Even though macro needs micro (Ghironi, 2018), the dominance of a macro-to-macro level effect in the extant protectionism literature hinders understanding of the mechanisms that enable a macro-to-micro effect.

However, a complication arises because the core pillars of the knowledge-based economy (Bustinza et al., 2022) underpinned by a knowledge-based view have not been applied to trade openness (a non-protectionist policy), where workforce diversity epitomizes an important outcome through distinct salient mechanisms. The current international circumstances affirm that international business's global drivers in the present market context are much different from the past in that contemporary economies now rely heavily on knowledge creation, sharing, and use through open trade regimes. These economies consider the role of knowledge as more important than natural resources, physical capital, and low-skill labor (OECD, 1996) and utilize this knowledge for research and development (R&D) purposes (Rodgers et al., 2022). In such a context, the internationalization of trade helps the economies get exposure to global competition, highly skilled workers, and investment capital, thereby facilitating knowledge flow worldwide (Schilirò, 2010). According to the World Bank, knowledge-based economies are supported by four pillars: (a) a favorable economic and institutional environment; (b) a sufficient information infrastructure; (c) a successful innovation system; and (d) a workforce that is educated and trained (Chen & Dahlman, 2006). One general rule for nations looking to build a knowledge-based economy around these pillars is to opt for open trade that encourages innovation and entrepreneurship over protectionist policies that shield domestic firms from foreign competition (Bosworth & Collins, 2003; Sachs & Warner, 1995). Thus, an open trade policy fosters innovation, invites investment, and, most importantly, accepts the diverse group of individuals who are the carriers of this knowledge, with different ethnicities and endowed with a varying knowledge base of other countries to the host nation. For these reasons, such knowledge societies are referred to as societies of diversity by UNESCO (2005). Hiring educated and competent workers is one of the fundamental tenants of the knowledge-based economy, which is likely to be successful through openness to people from varied backgrounds (Schiliro, 2010).

Such an issue is a cause for concern because the knowledge-related pathways and/or mechanisms that facilitate workforce diversity are likely to influence contemporary private/public organizations in a more meaningful way such that various state governments will initiate trade policies that further enhance their outcomes at the micro-level. For example, the existing contribution of immigrants to international trade predominantly from the economics literature portrays human capital externality-centered perspective (Felbermayr & Toubal, 2012), where immigrants indirectly facilitate trade activities through other economic agents (i.e., migrant networks)

through information and demand effects (Gould, 1994). Moreover, research highlighting how migrant networks impact trade via the information effect often assumed that higher-educated immigrants are more predisposed to facilitate the transnational flow of “ideas” than their lower-educated counterparts (Madhavan & Iriyama, 2009). In contrast, Lin and Yang (2017), focusing on the entrepreneurial aspirations that lead immigrants into trade-creation endeavors, find support for a pro-trade effect of migrant networks to be greater among low-skilled than high-skilled immigrants in the context of China. Other scholars further buttress the empirical inconsistencies in findings, mainly when information and demand effects of migrant networks are simultaneously considered (Wagner et al., 2002). Further, Hernandez (2014) has shown that determining the knowledge implications of immigrant networks requires understanding the knowledge-related mechanisms and unique contexts within which such particular benefits emerge.

The course of action to address this concern is a discourse on how workforce diversity (a micro-level outcome of a non-protectionist trade policy) can be achieved in a knowledge-based economy. That discourse focuses on the trade openness and critical drivers of the innovation ecosystem (i.e., venture capital and collaboration) that enable the attainment of workforce diversity. It entails elaborating on the pathways and mechanisms by which workforce diversity is attained. We provide a perspective on these pathways. We propose that workforce diversity is achieved in a setting with a multitude of knowledge sources. Therefore, the ability to achieve it is influenced by the knowledge-based environment. We suggest that trade openness and the innovation ecosystem are two essential components of this knowledge-based environment. Increased labor mobility is made possible by trade openness, increasing the amount of publicly accessible knowledge, skills, and capacities (cf. Andersson et al., 2016). Additionally, we contend that an open economy benefits domestic companies by luring venture capitalists and encouraging teamwork, both of which have a positive impact on how organizations treat a diverse workforce. Given the proposed course of action on how countries with low protectionism, or in other words, with open trade, impact workforce participation from diverse backgrounds, we seek to answer the research question: “*How do trade openness and critical drivers of the innovation ecosystem, i.e., venture capital and collaboration, influence workforce diversity in a country?*”

Our study makes two important contributions to the body of literature. Using information from 132 nations provided by the World Economic Forum (2019) and based on the four pillars of a knowledge-based economy, underpinned by the knowledge-based perspective: First, we add to the research on workforce diversity by examining the effects of trade openness, a policy-level macro variable. We expand this dominant view by refocusing the discussion on a macro-micro effect because the existing literature has primarily concentrated on a macro-macro effect (Kutlina-Dimitrova & Lakatos, 2017; Li & Whalley, 2020). This change is crucial for understanding how macro-level phenomena occur since they depend on lower-level interactions, processes, and structures to successfully develop and evolve (Coleman, 1990; Felin et al., 2012). The issue of the migration-trade nexus is covered in existing literature (e.g., Gould, 1994; Lin and Yang, 2017; Madhavan and Iriyama, 2009), but a focus on workforce diversity seems novel and distinct from the broad concept of migration.

It becomes considerably more pertinent when we explicitly link it to protectionism motivated by the link between trade openness and labor diversity. The influence of trade openness on the innovation ecosystem and workforce diversity is then further discussed. We highlight the trade openness microfoundations of our proposed model in order to highlight these crucial mechanisms and routes.

In essence, our contributions discuss the critical mechanisms of knowledge and innovation processes via which higher-level factors (such as national trade openness) and lower-level factors (such as labor diversity) interact. By situating the discussion within the field of knowledge management in international business (IB), it thereby increases understanding of the relationship between trade openness and workforce diversity from a protectionism standpoint.

1.1 Theory and Hypotheses

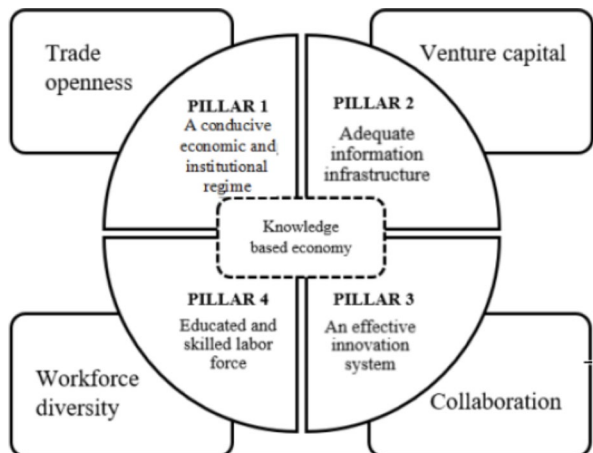
Using the four pillars of the knowledge-based economy (Chen & Dahlman, 2006; Kaur, 2022) as our foundation, we use the knowledge-based view (Kogut & Zander, 1993) as our major theoretical lens. The adopted theoretical perspective considers the concept of ‘epistemic communities’ (Fransson et al., 2011), which is implicit in the knowledge-based view because our examined phenomenon goes beyond firm-level hierarchies as the core progeny of superior knowledge exchange and recombination. According to Haas (1992), these epistemic communities serve as a vital network of experts from various fields and backgrounds, fulfilling roles in knowledge generation and exchange. For the simple flow of resources into and out of an economy, open trade rules serve as a crucial foundation. Innovation ecosystems and a pool of a diversified, talented labor are crucial sources of such knowledge-based assets in the contemporary economy.

As a result, contemporary economies strive to increase productivity and competitiveness by creating a knowledge-based society where the acquisition and dissemination of knowledge serve as key movers (Steinmueller, 2002). These economies establish the groundwork for specialization, research, innovation, and learning (Schiliro, 2010), which has a number of positive effects like increasing the proportion of intangible capital in the GDP and the expansion of educational and research institutions (Abramovitz & David, 1996). The movement of knowledge workers and the accessibility of foreign capital are two major factors in how well such economies operate.

As already mentioned, the advantages of a knowledge-based economy strongly suggest the necessity of an open rather than a closed trade policy that promotes the free flow of capital, both human and financial. The World Bank proposed four pillars as prerequisites for the development of an effective knowledge-based economy: (a) the presence of economic institutions and the institutional regime that permits the mobilization of resources that supports the creation and distribution of knowledge; (b) modern information infrastructure to process and communicate the knowledge; and (c) innovative ecosystems composed of businesses, universities, and research centers that can manage the global body of knowledge; and (d) skilled employees who can utilize this knowledge efficiently (Chen & Dahlman, 2006). We include variables for each of these pillars and look into their relationships to determine the

inner workings of how these pillars help create a knowledge-based economy. Trade openness, venture capital, collaborations, and a diverse workforce are the four indicators that stand in for the four pillars (see Fig. 1). First and foremost, knowledge-based economies need competitive environments that stimulate innovation and entrepreneurship, as well as economic regimes with open international commerce free from numerous protectionist laws (Sachs & Warner, 1995). Since a “knowledge conducive” economic environment encourages businesses to use and develop knowledge to compete effectively, we propose trade openness as a representation of pillar one based on this. Second, pillar two refers to a nation’s ICT infrastructure’s usability, dependability, and effectiveness (Chen & Dahlman, 2006). For a country to gain such infrastructure that can aid the functioning of knowledge economies, it is necessary to produce and use ICT. Companies, however, need sufficient funding in order to acquire the newest technology and ICT infrastructure. Venture capital, which is the fundamental engine of innovation ecosystems, is one important source of funding. To expand ICT, venture capital is encouraged in a number of developed and emerging nations (Singh et al., 2000). On the basis of this, we propose that the availability of venture capital constitutes the second pillar and provides the required technical and financial resources to help the businesses adopt and build their ICT infrastructure. Thirdly, pillar three denotes innovative systems made up of a network of research institutions, universities, and for-profit businesses that use existing information and adapt it to meet local needs in order to produce new knowledge (Chen & Dahlman, 2006; Berg & Lundberg, 2022). We classify multi-stakeholder collaboration as pillar three because it helps different entities’ knowledge flow. By collaborating more with other businesses, educational institutions, or research organizations, companies can obtain the most recent information and generate new knowledge. Lastly, a diverse workforce represents pillar four. A workforce of skilled people of different ethnicities, sexual orientations, or nationalities brings a diverse set of knowledge that improves knowledge creation, dissemination, and utilization within the organization (Chen & Dahlman, 2006; Lee et al., 2022). This notion is also supported by several scholars who emphasize that heterogeneous groups in organizations tend to have a broad range of task-relevant knowledge, skills, and abilities that are unique

Fig. 1 Four pillars of the knowledge-based economy



and non-redundant compared to organizations with homogeneous groups (Roberge & Dick, 2010). Based on this, we suggest that the fourth pillar of the knowledge-based economy, which generally talks about a rich human capital, gets fulfilled when there are people from different walks of life, i.e., a diverse workforce. We elaborate on each of the variables in subsequent sections:

1.2 Trade Openness and Innovation

As per the OECD Innovation Strategy, trade is considered a primary factor in strengthening business innovations worldwide (OECD, 2015; see also Johnson and Van Wagoner, 2021). Evidence suggests that open rather than restrictive trade between countries enables innovation to thrive (Auboin et al., 2021). To elaborate, the motive to innovate depends on market size, the intensity of the competition, and the prospective import and export competitors (Aghion et al., 2005). All these factors are heavily driven by trade openness. Firms gain access to foreign markets in an open market structure, which incentivizes them to raise R&D expenditure (Long et al., 2011). Due to the increase in competition, failure to innovate sweeps out firms from the market, forcing the surviving firms to innovate (Lileeva & Trefler, 2010). Besides, trade facilitates learning and transferring ideas (Johnson & Van Wagoner, 2021; Vogel & Wagner, 2010), especially across borders that develop international best practices for domestic firms (Grossman & Helpman, 1991; World Bank, 1997).

Several studies have explored the impact of trade on innovation in varied contexts. For instance, Long et al. (2011) noted that trade liberalization increases the R&D investment in a country when the trade costs are low. Bloom et al. (2016) observed that the increased import competition of China in the European market has resulted in faster technology change and patenting. Similarly, firms that capitalize on a liberalized trade market's opportunity improve their product specialization and increase their productivity growth. These instances show that exchanging knowledge across countries due to trade openness enhances innovation. Knowledge exchange is associated with improved foreign technology utilization, increased competition, and R&D collaboration with foreign companies (Baldwin & Gu, 2004; Yu et al., 2022). The benefits and related challenges from trade openness create an innovation atmosphere that builds an innovation ecosystem, defined as "the collaborative arrangements through which firms combine their offerings into a coherent, customer-facing solution." (Adner, 2006, p. 2). Such an ecosystem consists of stakeholders and collaborative relationships sharing the explicit purpose of co-creating value and innovation (Chesbrough et al., 2014; West & Wood, 2008; Jiang et al., 2022; Madanaguli et al., 2022). Entrepreneurial organizations such as venture capitalists, banks, and high-growth firms are the main drivers of such ecosystems (Guerrero et al., 2016). These stakeholders create space for small, young technology enterprises (Qian et al., 2018) to develop innovative solutions to cater to the fast-changing market needs. Other than financial support, such ecosystems provide diverse human resources that facilitate the system's knowledge flow (Russell et al., 2011; Iaia et al., 2023). However, in a protectionist market context, actors of these ecosystems become more reliant on internal resources for product development, which can stifle the pace and extent of innovation.

In contrast, a liberalized trade market removes such hurdles and smoothens the ecosystems by making financial and human resources available from foreign markets. For instance, due to a liberalized trade policy, IBM collaborated with foreign institutions, such as venture capitalists and universities, to run their R&D centers in different geographical locations (Chesbrough et al., 2014). Such international networks develop knowledge of foreign markets and knowledge partners due to labor mobility (Amal & Filho, 2010). Almeida and Kogut (1999) studied inter-firm labor mobility in Silicon Valley and found its positive association with knowledge localization. Such knowledge diffusion is mainly achieved by either hiring skilled people from diverse backgrounds or collaborating with other institutions (Rosenkopf & Almeida, 2003).

Although several studies investigated the impact of trade on building innovation ecosystems vis-a-vis the firm's growth and productivity, they have not elaborated much upon the combined impact of trade and innovation on workforce diversity. While trade openness opens the export markets and boosts domestic production, it also creates more jobs and better wages (Dutt et al., 2009). With trade liberalization, new knowledge gets transferred to and from the country through skilled labor mobility and brings many benefits to countries. For instance, Freeman (2004) observed that transferring people from developed to developing countries improves employees' well-being in underdeveloped countries. Inferences from these studies indicate the critical role of workforce diversity in countries and the vital need to promote it to flourish. However, studies have not looked into how trade openness contributes to achieving diversity in the workforce. This is a glaring gap because, despite researchers pointing towards a strong tendency among countries towards tilting to protectionism, management research has largely overlooked this phenomenon and its impact (such as diversity at the workplace) at a country level (Köllén et al., 2020; Iqbal et al., 2023). Addressing this gap, we explore how trade openness and the innovation ecosystem help develop a diverse workforce.

1.3 Workforce Diversity

Workforce diversity refers to “any significant difference that distinguishes one individual from another” (Kreitz, 2008, p. 102) in an organization. These differences can be attributed to various indirectly observable characteristics such as age, gender, and ethnicity (Milliken & Martins, 1996; Williams & O'Reilly, 1998) or unobservable characteristics, such as values, attitudes, or personality (e.g., Harrison et al., 2002; Liao et al., 2008), among others. Extant studies on workforce diversity have taken opposing views regarding its impact on organizations. The proponents argue that a diverse workforce leads to organizational success as it builds organizational capability (Sung & Choi, 2021; Wang et al., 2016; Rezaei et al., 2022; Yao et al., 2022). On the other hand, the opponents of workforce diversity argue that it leads to day-to-day organizational functioning issues, such as communication gaps, strenuous decision-making, and mistrust among employees (Swann et al., 2004; Timmerman, 2000). Given these two opposing views, in the present study, we take the “value in diversity” perspective about the importance of diversity in organizations.

Furthermore, the current competitive global environment requires a broader pool of competencies and capabilities to stay ahead in the market (Fernando et al., 2020).

Diversity provides a rich collection of thinking styles and diverse knowledge of cultures and customers' needs, which improves the organization's cognitive or attitudinal diversity (Wang et al., 2016). As per the "value in diversity" perspective, such heterogeneous talent pools bring exposure to different perspectives that improve decision-making quality (McLeod & Lobel, 1992; Williams & O'Reilly, 1998). The broad range of knowledge and ability produced by a diverse workforce in an organization helps the firm maintain its competitive position by bringing new products and services (Wang et al., 2016). Despite the benefits mentioned above of diversity in the workforce, discrimination against hiring minority groups and their unequal representation in the workforce is widely prevalent today (Workplace Equality Index, 2020). Due to such discrimination, transgender employees have to hide their sexual identity and self-categorize themselves in more socially acceptable sexual orientations (Ozturk & Tatli, 2016), increasing their stress. Another study found that pay and supervisory position is highly affected due to gender and race, i.e., women earn 13% less annually and are 3.8% less likely to have a supervisory position (Fitzsimmons et al., 2020). It is also worth noting that the prevalent global situations, such as the COVID pandemic and the Russia-Ukraine war, have widened the fractures between countries, thereby influencing organizational diversity (Delios et al., 2021; Lazarova et al., 2023). Such issues make it critical for academia and policymakers to understand what may encourage organizations to be receptive to a diverse workforce and use their diverse knowledge best.

Our review of prior studies indicates that workforce diversity is mainly studied at the team and organizational levels. At the team level, previous studies have mainly focused on the team members' characteristics such as personality (Tekleab & Quigley, 2014), education diversity (Valls et al., 2016), and value system (Woehr et al., 2013). Similarly, at the organizational level, diversity in leadership teams is helpful for organizational diversity (Cook & Glass, 2015; Dobbin et al., 2011; Kalev et al., 2006). However, despite scholars' call for understanding the macro-level impact on workforce diversity using a macro-level theory (Shore et al., 2009), there is a conspicuous absence of studies on the role of national-level policies and their impact on workforce diversity. Studies have focused on internal and external environmental factors that set the premise for developing organizational diversity management practices (Dobbin et al., 2011). For instance, in their study, Pitts et al. (2010) highlight that environmental favorability and uncertainty significantly impact diversity initiatives. Further extending their argument of the external environment's role, we study the effect of open trade policy on workforce diversity in organizations.

1.3.1 Trade Openness and Workforce Diversity

We argue that the benefits of trade openness impact organizations and enhance workforce diversity via three significant influences: (1) international mobility influence, (2) regulatory influence, and (3) peer influence. To elaborate, when countries become part of international trade regimes based on WTO principles, restrictions related to the labor movement become relaxed and less stringent (Jansen & Lee, 2007). Accordingly, transboundary labor movement under such agreements becomes more common, resulting in organizations having access to a diverse workforce. For

instance, under temporary entry agreements, workers' inter-country mobility possessing high skills with advanced training and education is welcomed by countries facing a shortage of skilled workers (Edmonston, 2016). These countries leverage the employees' international mobility to develop skilled labor in the home country (Lilly, 2019). As trade openness is an international trade principle, governments worldwide are forced to change their respective countries' business regulatory environment to bring standardized trade and business practices. Such regulations directed by WTO include strict labor standards that instruct core standards at the workplace (WTO, n.d.). Accordingly, in line with these principles, governments pressure businesses to implement workforce policies that align with the world's best practices. One such standardization pillar is non-discriminatory labor policies in organizations, which becomes essential with liberalized trade. For instance, studies have found that trade liberalization has increased women's role in gendered employment (Wamboye & Seguno, 2015), which indicates that companies adopt inclusion practices in such a context. Lastly, due to trade openness, multinational companies build global HR policies that inculcate demographic, cultural, and institutional embeddedness (Sippola & Smale, 2007) to cater to the needs of a global workforce that thrives on diversity. Such best practices put mimetic pressure (DiMaggio & Powell, 1983) on budding companies to follow similar HR policies in their organizations, resulting in improved workforce diversity (Pitts et al., 2010). Based on the influences mentioned above that arise due to trade openness, we hypothesize the following:

H1: Trade openness is positively associated with workforce diversity.

1.3.2 Trade Openness and Venture Capital

Trade liberalization intensifies competition among companies, and to survive, investment in building innovative solutions becomes necessary for them. Such a need to create innovative solutions facilitates the development of innovation ecosystems that are significantly supported by venture capitalists and MNEs (Del Giudice et al., 2023; Guerrero et al., 2016; Zheng et al., 2022). Venture capitalists play the role of an 'ecosystem engineer' through a proactive role in controlling and modulating resource flow in the ecosystem and creating space for new firms to join in (Sun et al., 2019). Besides, venture capitalists and large firms are looking for investment opportunities to improve their products or get an alternate source of attractive returns (Chesbrough, 2002). With open trade, these large enterprises look for overseas investment opportunities in new technologies. Accordingly, in an open market, big companies' demand for investing in upcoming innovation gets fulfilled by the supply of these innovations from young innovative companies. In sum, due to trade openness, these big companies and venture capitalists enter into open markets to provide financial support to the young innovative companies to get innovative solutions in return. Based on the above arguments, we propose the following:

H2: Trade openness positively impacts the availability of venture capital.

1.3.3 Venture Capital and Collaboration

Collaboration is regarded as a fundamental tenet of corporate sustainability (Nidumolu et al., 2014). In the current times, when technology and the market witness swift change, it is not feasible to acquire or develop in-house capabilities that cater to this fast-evolving market. Under such circumstances, collaborations are imperative to gain access to new markets and technologies without investing much in them (Demircioglu & Audretsch, 2019; Kepa et al., 2002). Companies collaborate with various internal and external stakeholders, such as customers, suppliers, and competitors, to gain knowledge, technical development, business expansion, and ease of market entry, among others (Degbey, 2015; Degbey & Pelto, 2021; Zhang et al., 2020).

In the current study, we jointly discuss three prominent collaborations: industry-university collaboration, inter-company collaboration, and intra-company collaboration. In industry-university collaboration, the companies provide their infrastructure and financial resources to universities for research purposes. Such collaborations offer mutual benefits where companies get cutting-edge research with lower R&D expenditure, and universities receive financial support for research activities (Lutchen, 2018). For instance, Boston University collaborated with Philips health-care to improve the acute care sector (Lutchen, 2018). In inter-company collaboration, both partners gain access to new markets, technological resources, expanded product offerings, and better economies of scale (Chesbrough, 2003; Meade et al., 1997). Lastly, in intra-company collaboration, cross-functional collaborations are formed to solve a joint problem (Carnabuci & Operti, 2013) or exchange knowledge to build capabilities to respond to market demands more quicker (Colombo et al., 2011). The primary goal of all such collaborations is to find innovative solutions. However, for a collaborative relationship to function effectively, critical resources such as finance, time, employees, and equipment are essential (Rybnicek & Königsgruber, 2019). Due to this reason, venture capital has become a primary factor in driving the quest for innovative solutions and attaining success in these collaborations. Several researchers (Popov & Roosenboom, 2013; Samila & Sorenson, 2011) have observed that due to venture capital investment, the rate of new business creation also increases along with employment and aggregate income. Such positive externalities highlight that venture capital develops the feasibility of finding innovative solutions. However, it is essential to highlight that the desire of venture capitalists to be in control can or may limit new ventures' formation of future collaborations with other parties. However, such a limiting effect is more likely adequate because the new venture does not already establish a reputable position across other collaborative networks (cf. Ozmel et al., 2013).

As discussed before, venture capitalists invest in business solutions that are innovative and comparatively new in the market. Due to this, they demand a higher return on investment to cover up the risk they put into the company (Zider, 1998). Companies also deal with risks associated with building innovative solutions due to the high uncertain probability of success. Companies enter into collaborations with different stakeholders to disperse such risks and access other markets or technologies quickly. For instance, companies build a knowledge-based value chain with collaborations to

reduce supply chain risk (Chen et al., 2013). Similarly, the risk of failure associated with product development is also known to be dispersed with the help of collaboration (Hagedoorn, 1993). Based on these arguments, we propose that with the increase of venture capital availability, companies enter into collaborations to minimize the high risk of getting venture capital investments and maximize the capital provided by venture capitalists.

H3: Venture capital positively impacts collaboration.

1.3.4 Collaboration and Workforce Diversity

Collaboration involves employees and researchers with different backgrounds and characteristics coming together to achieve a mutual objective. Heterogeneity in such groups makes these collaborative teams diverse and rich. Other than demographic diversity, such as ethnicity, religion, sexual orientation, and gender, such collaborative teams also possess diversity in the functional specialization (Drach-Zahavy, 2011). Since diversity brings heterogeneous knowledge sources to the collaborative network, developing innovative solutions also improves. Olsen et al. (2022) have noted a positive association between innovation and workforce diversity because such cultures encourage diverse perspectives and ideas. For instance, the quadruple helix model of innovation is one example of four prominent diverse actors in the innovation system: science, policy, industry, and society come together to bring innovative processes (Schütz et al., 2019). Such collaborations with a diverse group of people bring in new ideas, develop radical innovations (Díaz-García et al., 2013), and build the capacity to exploit external knowledge (Cohen & Levinthal, 1990).

We argue that such diversity in collaborative teams leads to organizational diversity due to mimetic isomorphism. Mimetic isomorphism is adopted when there are “ambiguous causes or unclear solutions” (DiMaggio & Powell, 1983, p. 151), in which a company mimics the behavior of other companies it perceives to be successful (Kolk & Perego, 2010). Studies on inter-organizational mimetic isomorphism discuss the companies’ mimetic behavior towards mergers and acquisitions (Tseng & Chou, 2011), joining CSR activities (Amor-Esteban et al., 2018), and adopting sustainable business practices (Martínez-Ferrero & García-Sánchez, 2017). Williamson and Cable (2003), in their study of the top management team (TMT) hiring patterns, found that firms prefer to hire executives from which the other fortune 500 companies used to hire. Based on similar grounds, in the current study, we argue that when companies witness employees from diverse backgrounds bringing unique knowledge and solutions into successful collaborative teams, they will indulge in mimetic isomorphism and adopt a diverse workforce to gain similar benefits. Based on the above discussion, we argue that:

H4: Collaboration positively impacts workforce diversity.

1.3.5 Serial Mediation of Venture Capital and Collaboration Between Trade Openness and Workforce Diversity

Combining hypotheses 1–4, we logically propose a serial mediation hypothesis between trade openness and workforce diversity through two essential and positive variables, i.e., venture capital and collaboration. We submit that the impact of trade openness at the macro level will also impact the organizational level. This will manifest through the development of an innovation ecosystem in the country. As discussed earlier, trade openness intensifies competition in the domestic market, which triggers the need to develop innovative solutions (Alvarez & Robertson, 2004; Vishwasrao & Bosshardt, 2001). Such a macro-level policy measure taken by the government impacts the business ecosystem, increasing the demand to create innovative solutions. As venture capitalists seek to invest in innovative businesses, an increased demand for innovative solutions will attract them to the liberalized market.

Further, with the rise of venture capital availability, companies will enter into collaborations to share the burden of paying a high investment return for a very uncertain and risky innovative business venture. Witnessing the diversity among collaborative teams bringing diverse knowledge to build innovative solutions (Steele & Derven, 2015) will make companies mimic these successful collaborative teams' practices and adopt pro-diversity practices. Based on the above argument, we propose that the impact of trade openness, through venture capital availability and collaborations, increases diversity in organizations eventually.

H5: Trade openness has a positive indirect impact on workforce diversity through venture capital and collaboration.

2 Methods and Data

2.1 Variables and Measures

We used secondary data from the reputed Global Competitiveness Report (GCR) 2019 of the World Economic Forum (WEF) (Schwab, 2019). GCR report provides an extensive database of countries with their scores on dimensions measuring their competitiveness. The report provides 12 pillars on which the competitiveness of a country is measured. Such archival data is widely accepted in research as they remove the constraint of primary data collection for cross-country research (Frankfort-Nachmias & Nachmias, 2007). Also, it helps in generalizing the results (Kiecolt & Nathan, 1985). Our study involves 132 countries (see the list in Appendix A), which is higher than the minimum data point limit of 50 (Hair et al., 2006).

Out of 132 countries, 66.6% of countries are developing, and 33.3% are developed based on the definition given by United Nations. Also, as per the GCR 2019 dataset, the United States is ranked as number one in the innovation ecosystem, followed by Germany and Sweden. Around 40% of the countries were above the average score of the innovation ecosystem.

The dependent variable in this study is *workforce diversity*. Respondents were asked the question, “In your country, to what extent do companies have a diverse workforce (e.g., in terms of ethnicity, religion, sexual orientation, gender)?” on a Likert scale from 1 to 7, where 1 is no diversity, and 7 is diversity at great extent.

To identify the impact of trade openness on diversity, we used the *trade openness* variable from the WEF database. The variable is an aggregated score comprising the prevalence of non-tariff barriers, trade tariffs, the complexity of tariffs, and border clearance efficiency. Each of these was assessed differently. For non-tariff barriers, respondents were asked, “In your country, to what extent do non-tariff barriers (e.g., health and product standards, technical and labeling requirements, etc.) limit the ability of imported goods to compete in the domestic market?” on a Likert scale from 1 to 7, where 1 is strongly limit, and 7 is do not limit at all; trade tariffs were calculated as the average of effectively applied rates weighted by the product import shares corresponding to each partner country; tariff complexity was assessed on four criteria: tariff dispersion, the prevalence of tariff peaks, the prevalence of specific tariffs and the number of different tariffs., and border clearance efficiency was assessed based on the effectiveness and efficiency of the clearance process by customs and other border control agencies. The GCR database provides an aggregate trade openness score based on these four factors.

Two mediating variables in our study representing the innovation ecosystem are venture capital and collaboration. *Venture capital availability* in the country was measured by asking, “In your country, how easy is it for startup entrepreneurs with innovative but risky projects to obtain equity funding?” with one being extremely difficult and seven being extremely easy. For the second mediating variable, we use the *multiple stakeholder collaboration* scores from the GCR database that provides a consolidated score of three types of collaborations. It comprises collaboration within the companies, between the companies, and the collaboration of companies with universities. The following questions were asked in the GCR survey for respective collaborations: “In your country, to what extent do people collaborate and share ideas within a company?” (collaboration within the company); “In your country, to what extent do companies collaborate in sharing ideas and innovating?” (a collaboration between the companies); “In your country, to what extent do business and universities collaborate on research and development (R&D)?” (a collaboration between the companies and universities); on a scale of 1 being not at all; 7 being to a great extent.

2.2 Control Variables

To control the impact of extraneous influence, we used eight control variables, namely, (a) labor policy; (b) ease of hiring foreign labor; (c) government ensuring policy stability; (d) GDP per capita (e) developed/developing countries; (f) growth of innovative companies; (g) market capitalization; (h) finance available to SMEs’. Our rationale for selecting these variables is based on past studies that indicated their potential influences on our variables of interest. To elaborate, (1) labor policy affects labor mobility (Sundaram et al., 2012); (2) the foreign workforce’s skill composition significantly impacts an organization’s diversity performance (Suedekum et al., 2014); and (3) there is a perceptible diversity among workforce between developed

and developing countries (Amin, 2021), we accounted for their effect on diversity by including (1) labor policy; (2) ease of hiring foreign labor; and (3) development status of countries, respectively, as controls on workforce diversity.

Further, (1) policy stability is an attractive indicator for firms wanting to enter into collaboration (James & Vaaler, 2018); (2) financial resources are critical determinants of collaboration among institutions such as universities and industries (Sellenthin, 2011); (3) innovation collaborations differ between developed and developing countries (Mgonja, 2017); (4) growth of new business models used by new and innovative businesses promote research collaboration among various entities in a country (Beltramello et al., 2013); and (5) financing of SMEs is critical to enhancing collaboration necessary for technological innovation (Ma et al., 2010), we accounted for their effect on collaboration by including (1) GDP per capita; (2) development status of countries; (3) growth of innovative companies; (4) financing of SMEs; and (5) market capitalization of companies, respectively, as controls on collaboration.

Furthermore, (1) policy stability plays a critical role in increasing investment by venture capitalists (Guler & Guillén, 2010); (2) economic growth influences venture capital investment in a country (Pradhan et al., 2016); (3) there are indications of difference in innovation collaborations between developed and developing countries (Tykiová & Schertler, 2011); and (4) the growth of new businesses affect venture capital availability in a country (Gu et al., 2018), we accounted for their effect on venture capital availability by including (1) policy stability; (2) GDP per capita; (3) development status; and (4) growth of innovative companies, respectively, as controls on venture capital availability.

3 Results

3.1 Descriptive Statistics and Correlations

Descriptive statistics and the correlations between the variables are given in Table 1. As shown in the table, most correlations are below the permitted level of 0.8, suggesting that the multicollinearity will be low (Gujarati et al., 2012). However, to rule out the possibility of multicollinearity, we also calculated the variance inflation factor (VIF), as Hair et al. (2006) suggested. The VIF values ranged from 1.037 to 8.84, which was also within the permitted limit of less than the traditionally acceptable cutoff of 10 (Gujarati et al., 2012), suggesting that the multicollinearity was within the limit.

3.2 The Hypotheses Testing

We followed the partial least square (PLS) approach to test our hypotheses rather than the covariance-based SEM (CB-SEM). Hair et al. (2019) suggested that PLS-SEM should be preferred over CB-SEM in the following situations. First, PLS-SEM is preferred for analyzing secondary data from a measurement theory perspective as, unlike survey measures, measures used in secondary data sources are typically not created for confirmatory analyses (Sarstedt & Mooi, 2019). Thus, achieving

Table 1 Descriptive statistics

	Mean	Std. DV.	TRADEOP	VENTCAP	COLLAB	DIVERSE	GRINNOV	EASEOH	GOVPOL	LABPOL	FINSME	MKT-CAP	DE-VEL-OP
TRAD-EOP	58.112	9.159	-										
VENT-CAP	3.258	0.816	0.550**	-									
COLLAB	3.867	0.696	0.504**	0.864**	-								
DI-VERSE	4.489	0.649	0.442**	0.574**	0.676**	-							
GRIN-NOV	4.137	0.621	0.473**	0.834**	0.898**	0.690**	-						
EASEOH	4.148	0.614	0.204*	0.161	0.196*	0.180*	0.176*	-					
GOVPOL	4.057	0.966	0.523**	0.702**	0.740**	0.621**	0.690**	0.334**	-				
LABPOL	3.525	1.059	0.534**	0.797**	0.829**	0.556**	0.757**	0.099	0.719**	-			
FINSME	3.937	0.701	0.564**	0.918**	0.824**	0.600**	0.804**	0.175*	0.724**	0.773**	-		
MKT-CAP	49.754	104.738	0.435**	0.410**	0.410**	0.329**	0.368**	0.013	0.366**	0.324**	0.403**	-	
DEVEL-OP	0.333	0.473	0.369**	0.325**	0.386**	0.095	0.318**	-0.006	0.146	0.536**	0.313**	0.043	-
GDP	2.248	0.769	0.169	0.470**	0.436**	0.279**	0.461**	0.019	0.165	0.317**	0.388**	0.265**	0.189*

Note. N = 132; TRADEOP: Trade openness; VENTCAP: Venture capital; COLLAB: Collaboration; DIVERSE: Workforce diversity; GRINNOV: Growth of innovative companies; EASEOH: Ease of hiring foreign labor; GOVPOL: government ensuring policy stability; LABPOL: Labor policies; FINSME: Financing of SMEs; MKTCAP: Market capitalization; DEVELOP: Developed and developing countries; GDP: Gross Domestic Product

** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed)

model fit with secondary data measures is unlikely when using CB-SEM (Hair et al., 2019). Second, while using secondary data, researchers do not have the opportunity to refine the measurement model to achieve fit. In addition, it allows the unrestricted use of single-item and formative measures (Hair et al., 2014), making it invaluable for research based on secondary data. Third, “PLS-SEM should always be the preferred approach in situations with formatively measured constructs because a MIMIC approach in CB-SEM imposes constraints on the model that often contradict the theoretical assumptions” (Hair et al., 2019, p. 7; see also Martínez-Navalón et al. 2023; Nwankpa et al., 2022). Further, Sarstedt et al. (2016) confirmed that PLS-SEM performs much better than CB-SEM for composite models as in our study. Given the above reasons, PLS-SEM is the appropriate method for our study context; thus, we preferred PLS-SEM instead of CB-SEM. SMART PLS (3.3) was used for the hypotheses testing.

3.3 Tests for Direct Impact

We used PLS bootstrapping with 5000 resamples (Hair et al., 2017). Table 2 provides the results for hypothesized direct relationships. The direct relationship of the independent variable, i.e., trade openness with (a) workforce diversity, came out significant (H1: $\beta=0.179$; $p<0.05$); and (b) venture capital came out to be positive and significant (H2: $\beta=0.135$; $p<0.01$). The relationship between the mediators, i.e., venture capital and collaboration, was also positive and significant (H3: $\beta=0.322$; $p<0.001$). The positive and significant result supported the direct relationship between collaboration and workforce diversity (H4: $\beta=0.600$; $p<0.001$). Regarding the control variables, as given in Table 2, the growth of innovative companies was found to have a significant relationship with venture capital and collaboration. Government ensuring policy stability and GDP was found to have a significant relationship with venture capital. Developed and developing countries were found to have a significant relationship with collaboration, diversity, and trade openness. However, financing to SMEs, market capitalization, and ease of hiring foreign labor did not have significant relationships. Our model explained 76.4% of the variance in venture capital, 86% in collaboration, and 51.8% in workforce diversity in terms of predictive power.

3.4 Tests for Serial Mediation

Table 3 provides results for the hypothesized serial mediation explaining the path between trade openness and workforce diversity through two mediating variables, i.e., venture capital and collaboration. To assess the serial mediation effect, we followed the Preacher and Hayes (2008) bootstrapping approach for mediation analysis in this study. The serial mediation result was positive and significant (H5: $\beta=0.026$; $p<0.05$), explaining the presence of full mediation, i.e., the relation between trade openness and workforce diversity manifests through the mediating variables rather than a direct relationship. Table 3 reports the bias-corrected 95% bootstrap confidence intervals that did not include zero for the indirect path, suggesting the significance of H5. A summary of the results is presented in Fig. 2.

Table 2 Hypotheses testing

	Path coefficients (β)			
	VENT CAP	COLLAB	DIVERSE	TRADEOP
Control Variables				
GRINNOV	0.51***	0.562***		
EASEOH			0.015	
GOVPOL	0.247***			
LABPOL			0.098	
FINSME		0.030		
MKTCAP		0.059		
DEVELOP	0.046	0.094**	-0.256**	0.0349***
GDP	0.163**	-0.020		0.103
Inde- pendent Variables				
TRADEOP	0.135**		0.179*	
Mediating Variables				
VENT CAP		0.322***		
COLLAB			0.600***	
R-Square	0.764	0.860	0.518	

Note. N=132; TRADEOP: Trade openness; VENTCAP: Venture capital; COLLAB: Collaboration; DIVERSE: Workforce diversity; GRINNOV: Growth of innovative companies; EASEOH: Ease of hiring foreign labor; GOVPOL: government ensuring policy stability; LABPOL: Labor policies; FINSME: Financing of SMEs; MKTCAP: Market capitalization; DEVELOP: Developed and developing countries; GDP: Gross Domestic Product

*p<0.05 **p<0.01 ***p<0.001 (2-tailed)

Table 3 The mediation analysis

	Total Effect	Direct effect	Indirect effect via VENTCAP and COLLAB
TRADEOP ◊	0.205	0.179	0.026
DIVERSE	(0.063 to 0.338) ^a	(0.037 to 0.320) ^a	(0.004 to 0.054) ^a

Note. N=132; TRADEOP: Trade openness; VENTCAP: Venture capital; COLLAB: Collaboration; DIVERSE: Workforce diversity; GRINNOV: Growth of innovative companies; EASEOH: Ease of hiring foreign labor; GOVPOL: government ensuring policy stability; LABPOL: Labor policies; FINSME: Financing of SMEs; MKTCAP: Market capitalization; DEVELOP: Developed and developing countries; GDP: Gross Domestic Product

^a95% confidence interval that does not include a zero

3.5 Robustness Check

The abovementioned analysis of 132 countries supported our research model, and we repeated the analysis using the same dataset using the CB-SEM with the analysis tool STATA. Our findings from the secondary analysis were very similar to the analysis done using the PLS-SEM method. For instance, trade openness was found to be indirectly and positively associated with workforce diversity through venture capital and collaboration (β=0.002; p<0.05). Direct effects, for instance, trade openness to venture capital, venture capital to collaboration, and collaboration to workforce

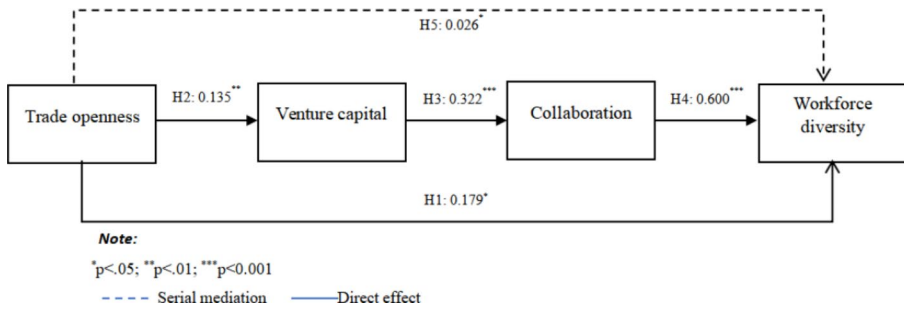


Fig. 2 Path analysis results

diversity, also gave positive and significant results. In sum, this additional analysis offered evidence for robust results.

4 Discussion and Conclusion

As the foundation of most knowledge-based resources is primarily intangible and dynamic making way for idiosyncratic development (Curado & Bontis, 2006), protectionist measures' resurgence is a cause of grave concern for the world economy. As a knowledge-based economy demands a free flow of knowledge transfer, it is necessary to have an open market to facilitate labor and capital movement. Emphasizing the importance of having a diverse workforce to improve knowledge creation, we undertake this study to explore the relationship between trade openness and workforce diversity. Workforce diversity and the concept of migration have a close connection. However, prior research in this domain focuses on illuminating the migration-trade linkage (Gould, 1994; Lin & Yang, 2017; Madhavan & Iriyama, 2009). This focus has resulted in a major perspective described as the human capital externality-centered theory (Gould, 1994). Research in the field of IB departing from this overall perspective adds an entrepreneurship theory perspective, espousing a stronger aspiration of low-skilled migrants relative to their high-skilled counterparts (Lin & Yang, 2017). From which we draw inspiration for a knowledge-based perspective, these major theoretical perspectives tend to be heavily economic-centric. Thus, much of the research on the impact of trade openness has focused on improving economy-related aspects, such as import and export performance and growth rate (Fukuda, 2019), with a few studies focusing on the labor policies such as employment and wages (Galani & Sanguinetti, 2003). However, studies have overlooked the influence of trade openness on factors affecting the organizational workforce. One such factor is the availability of a diverse workforce in the labor market. Due to trade openness, market expansion in foreign countries and foreign players' entry into domestic markets enhances labor mobility and creates diverse employees. The implication of trade openness for an organization and its related discriminatory practices against minority groups is not well explored in the research. Despite the benefits of a diverse workforce, there is a lack of understanding of workforce diversity from a macro-level (i.e., cross-country-level) perspective. Our study strives to address this

gap by grounding on the four pillars of a knowledge-based economy and exploring the relationship between trade openness and workforce diversity by integrating the innovation ecosystem concept. Accordingly, we posited a direct link between trade openness and workforce diversity and an indirect association through venture capital and collaboration. The direct hypotheses (hypothesis 1) were supported, which suggests that the influence from the peer countries and the regulatory bodies will direct the countries to adopt a nondiscriminatory labor policy and promote workforce diversity. Extant literature suggests open trade enhances the availability of skilled workers that possess skills complementary to natives; our results further this argument and suggest it is also true that due to open trade, workforce diversity within the country also advances (Fassio et al., 2019). The support for serial mediation (hypothesis 5) implies that the impact of a national-level trade policy affects workforce diversity through venture capital and collaboration. While prior studies have focused on the implications of trade openness on labor policies (Ranjan, 2012), our study shows that there are other pathways through which the benefits of trade openness manifest. Moreover, one such pathway is through the innovation ecosystem, comprising venture capital and collaboration. As the innovation ecosystem in an open market gets powered up with venture capitalists' investments and collaborations with different stakeholders, the knowledge flow across the countries happens through highly skilled employees. The mobility of such highly skilled employees due to collaborations will increase employees from diverse backgrounds (that is, employees with varied nationalities, sexual orientations, and ethnicity) in the workforce. In summary, our study supports the argument that when a country's trade opens, it increases the venture capital availability, thereby increasing the propensity to be involved in a collaboration, resulting in increased workforce diversity.

Consistent with prior studies' observation that trade is a critical antecedent of R&D spending (Long et al., 2011), our results (hypothesis 2) suggest that trade openness creates an environment conducive for venture capitalists to invest. As the pressure of import competition and the opportunity to expand in foreign markets arise, developing innovative solutions becomes necessary, creating a need for capital in the ecosystem, thus attracting venture capitalists. For instance, due to liberalization and active governmental support for venture capitalists to invest, the Swedish venture capital market has now gained the top 10 most active in the world (Lerner & Tåg, 2013). Further, support for hypothesis 3 confirmed the impact of venture capital on collaboration. As venture capital is considered an essential ingredient of a thriving innovation ecosystem (WEF), companies best utilize this opportunity by entering into a partnership with different stakeholders. Tortoriello et al. (2011) said that companies prefer collaborating to enhance knowledge transfer in an innovation ecosystem. Moreover, since venture capitalists fill the capital void for a risky innovation venture, they require a sufficient return on investment (Zider, 1998). So, to share the risk of being funded by venture capitalists and get quick access to the global market and technologies, companies enter into collaboration (Chesbrough, 2003; Majava et al., 2013).

Hypothesis 4 explains the positive relationship between collaboration and diversity in the workforce. The collaboration of organizations with multiple stakeholders

involves integrating knowledge brought by people from diverse backgrounds and experiences. This heterogeneity among the workforce and its impact on the teams' creativity is well studied (Díaz-García et al., 2013; Berraies & Chouiref, (2023). Companies part of these ecosystems witness the advantages of knowledge transfer brought in by diverse collaborative team members and adopt similar practices of firms. Our argument is supported by the concept of mimetic isomorphism (DiMaggio & Powell, 1983), which explains companies' mimetic behavior toward adopting workforce diversity in their organization to enhance the company's knowledge creation, sharing, and use.

4.1 Theoretical Contributions

This study significantly advances the theoretical understanding of workforce diversity and trade openness. First, our study demonstrated the role that trade policy at the federal level plays in addressing the underrepresentation of minorities in the labor market. Studies are lacking in understanding how the external environment, particularly governmental trade policy, promotes workforce diversity, despite the fact that research have elaborated on the importance of the company's internal environment in encouraging it (Cook & Glass, 2015; Dobbin et al., 2011). Our findings demonstrate that trade openness indirectly enhances workforce diversity through two critical intervening factors, namely the availability of venture capital and collaboration. These intervening variables provide trade openness benefits to reach the organizational level. In summary, the aforementioned contributions strengthen the IB literature by reorienting the current debate from a macro-macro effect to a macro-micro effect, underscoring vital trade (openness) microfoundations in the process. The lower-level processes, interactions, and structures (i.e., microfoundations) exert an upward influence that shapes the emergence of a macro-level policy (trade openness) phenomenon (Coleman, 1990; Felin et al., 2012). Additionally, a focus on workforce diversity seems novel and distinct from the broad concept of migration, as we make explicit its connection to protectionism in contrast to the dominant macro level, economic-centric discussion of the migration-trade nexus (Felbermayr & Toubal, 2012; Gould, 1994; Madhavan & Iriyama, 2009).

Second, grounding our discussion on the innovation ecosystem concept, our research is instrumental in extending the understanding of trade openness and innovation. As mentioned before, several studies have focused on how various aspects of trade openness create opportunities for innovation in a country (Kiriyaama, 2012); however, the underlying mechanism that enhances the country's innovation ecosystem due to trade openness is less explored. Accordingly, the current study focuses on the two key drivers of an innovation ecosystem, i.e., venture capital and collaboration (Guerrero et al., 2016), to understand how these drivers behave in a liberalized market. We submit that open economies create opportunities for venture capitalists to invest in young innovative businesses and promote collaboration among multiple stakeholders to access the market and optimally utilize the resources. Past studies have mentioned that trade will open up avenues for capital flow (Antràs & Caballero, 2009); however, businesses need investors ready to invest in risky businesses

to promote innovative solutions. Venture capital is one such investment source that invests in promising new inventions. For instance, venture capitalists are the ones that backed up the big giants like Apple, Amazon, and Facebook before their initial public offerings (Lerner & Nanda, 2020). As a result, our study adds to the body of literature by emphasizing the value of collaboration and venture capital in maximizing the advantages of trade openness. This study constitutes a critical early investigation providing theoretical reasoning and empirical support for extending workforce diversity literature using a national-level trade policy.

4.2 Practical Contributions

Firstly, innovation is the basis for economic development, especially for developing countries (Léger & Swaminathan, 2007). Failing to innovate in the current competitive environment can take companies out of the competition. As per a recent study, 90% of Indian startups fail in their initial five years due to the lack of innovation (Mehrotra et al., 2016). These startups need a skilled workforce, funding, and formal mentoring (D’Cunha, 2017). The resources are provided by venture capitalists who can provide both the funds and guidance to enter the market with running big organizations. Our study found that due to trade openness, venture capital availability also improves, which is a positive sign for these young companies. Policymakers should focus on keeping the trade barriers low so that the domestic country may attract foreign venture capitalists to support the young innovative companies.

Secondly, the past decade has witnessed significant social and political changes that created pressure on companies to take a step toward diversity and inclusion (Pedulla, 2020). Studies have pointed out the importance of having a diverse top management team as a prerequisite for equal participation of minority groups in the workforce (Cook & Glass, 2015). In line with these studies, our research suggests that national-level policies such as trade openness indirectly bring diversity to the organization. A diverse workforce makes the company more reputed in society (Brammer et al., 2009) and helps adjust the product and services per the needs of different customers. Hence, we recommend that policymakers ensure that business ecosystems should encourage the development of innovative solutions and foreign collaborations in a liberalized market. Organizations will become more open to people from diverse backgrounds and increase their participation in the workforce.

In conclusion, we note that while protectionist trade policies are gaining ground on the world market, we comprehend how governments can promote workforce diversity and a knowledge-based economy by avoiding such restrictive trade policies. The study went into greater detail about how trade openness impacts the innovation ecosystem and enhances workforce diversity by drawing on the four pillars of the knowledge-based economy. The findings of the study give diversity researchers a new way to look at the phenomena from a broad angle. Notably, it informs policy makers on the value of trade openness in creating workforce diversity, an ecosystem for innovation, and a knowledge-based economy.

4.3 Limitations and Future Research Directions

This study has flaws that need to be addressed in additional research despite providing important findings. First, the venture capital and collaboration variables employed in our study were intended to illustrate the innovation ecosystem idea. The innovation ecosystem is primarily driven by entrepreneurial and innovative companies, but other ecosystem elements, such as the inventive processes involving the level of entrepreneurial and innovative mindset, may also be investigated. Furthermore, it would be intriguing for future study to choose specific groups of companies that are backed by venture capitalists and are cooperating with the ecosystem using original rather than archival data, scrutinizing the impact of venture capital on collaboration in greater detail.

Secondly, our study focuses on the presence of a diverse workforce in the organization. However, this is insufficient to ensure their equal participation in the organization, as we have not tested the level of inclusion. Inclusion and diversity are conceptually separate constructs. Inclusion is understood as the involvement of employees with diverse characteristics in the organizational system, and diversity is viewed as the variability in the workforce's composition (Boekhorst, 2015). Future studies may address this gap by examining the impact of trade openness and innovation ecosystem on the diverse workforce's inclusion.

Thirdly, in order to clarify the function of multiple systems and their connection to workforce diversity, diversity researchers may look at other macro-level theories, such as systems theory (Morgeson et al., 2015; Ward, 1993). Finally, since causality could not be proven with certainty, we tested our hypothesized link using cross-sectional data. Future research may use a panel study to further elucidate the effect of trade openness on the organizational workforce, even though our study provides a theoretical indication for causality.

Fourthly, we tested our model using cross-sectional data because there weren't enough data to perform a panel analysis. We recognize this drawback, nevertheless, and advise researchers to test the model using a more advanced econometrics method.

Appendix A

Countries analyzed.

Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Belgium, Benin, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Chad, Chile, China, Colombia, Congo, Costa Rica, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Eswatini, Ethiopia, Finland, France, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Haiti, Honduras, Hong Kong SAR, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Korea, Kuwait, Kyrgyz Republic, Latvia, Lebanon, Lesotho, Lithuania, Luxembourg, Malawi, Malaysia, Mali, Malta, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Morocco, Namibia, Nepal, Netherlands, New Zealand,

Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russian Federation, Rwanda, Saudi Arabia, Senegal, Serbia, Seychelles, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Viet Nam, Zambia, Zimbabwe. (N=132)

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