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Five Key Aspects of Climate Change in Slovakia

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Climate change and the necessary actions to combat it create significant risks and challenges for governments, financial sectors, businesses, and households across Europe. Against this backdrop, the European Commission (EC) developed ambitious plans to balance the need for fast decarbonization with the substantial economic costs associated with this process. Slovakia, a heavily industrialized economy, faces several hurdles in achieving a sustainable, decarbonized future. At the same time, it faces increasing physical risk in the form of floods or droughts, impacting sectors from agriculture to finance. This policy brief distils the key insights from a recent NBS conference titled 'Climate and Sustainability Risks and Opportunities'. It emphasizes the crucial role of data, cooperation between the government, the financial sector and business, as well as regulatory support in addressing climate risks. In addition to flagging the challenges, the brief also explores opportunities inherent in tackling climate risk and sheds light on the role of banks in promoting environmentally responsible practices.

In Slovakia, green investments stem primarily from EU funding.

Risks stemming from climate policies are prominent in Slovakia. Thus, understanding the economic transmission channels form climate risks to financial risks is essential.

The decarbonization necessitates a well-balanced mix of various energy sources with ample room for renewable energy sources.

Profitability and lack of demand for green products stand as one of the major hurdles impeding the swift penetration of sustainability in business.

Targeted public policies, long-term financing programs, and technical assistance may help enhance energy efficiency in public and private buildings.

Introduction

Climate change and the necessary actions to combat it create significant risks and challenges for governments, financial sectors, businesses, and households across Europe. Against this backdrop, the European Commission (EC) developed ambitious plans to balance the need for fast decarbonization with the substantial economic costs associated with this process. Slovakia, a heavily industrialized economy, is no exception, and its path to a net-zero future is also fraught with challenges. Against this background, this policy brief examines five crucial areas for achieving a sustainable, carbon-neutral Slovak economy.

The industrial nature of the Slovak economy creates significant challenges for the prospect of timely and effective climate change actions. No single player, neither government, financial sector, nor business holds the key to success for this process. Hence, a joint effort through cooperation, policy coordination, and mobilizing financing is needed to define the way forward. Slovakia's economy grapples with the costs and risks of transitioning to a low-carbon model (transition risks). At the same time, it faces the threat of floods and droughts (physical risks).

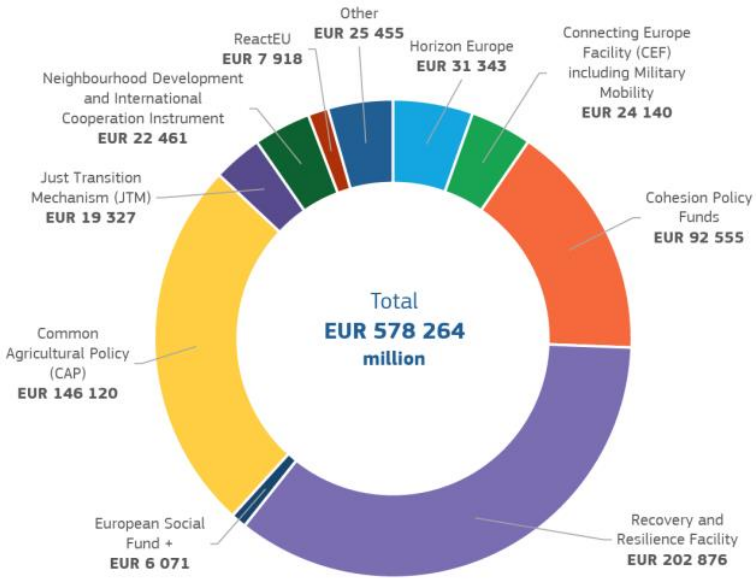
This policy brief distills the central themes and key insights from a recent NBS conference titled *Climate and Sustainability Risks and Opportunities.*[1] It emphasizes the crucial role of data, cooperation, and regulatory support in addressing climate risks. In addition to flagging the challenges, the brief also explores the opportunities inherent in tackling climate risk and sheds light on the role of banks in promoting environmentally responsible practices.

1. Financing Transformation to Net-Zero

Transitioning to a net-zero economy requires substantial public and private investments. A comprehensive policy framework for green investments must be in place to make this available. The European Commission estimates that almost one trillion euros per year is needed in Europe to achieve net-zero emissions by 2050. In Slovakia, the target is a 55% reduction in emissions by 2030, with the ultimate goal of carbon neutrality by 2050. The Slovakia carbon reduction plans require mobilizing 8 billion euros by 2030 and 200 billion euros by 2050, six times the annual budget of Slovakia. Achieving these substantial financial commitments at the European and national levels requires full cooperation and awareness from all involved parties.

[1] Conference recordings are available here: https://nbs.sk/o-narodnej-banke/konferencie-a-podujatia/climate-and-sustainability-risks-and-opportunities/

Chart 1
How much does the EU spend on climate change?



For 2021-2027, the EU budget – including NextGenerationEU – is projected to contribute EUR 578 billion to climate spending, representing 32.6% of the budget.
Source: European Commission.

The Slovak financial sector is dominated by banks, they need to play a crucial role in financing the green transition. Banks can for example ramp up their contribution to this process by offering products conditioned on specific emissions reduction targets. By contrast, the current ability to secure funding regardless of environmental stance is likely to change in the medium term, emphasizing the increasing importance of sustainability. The responsibility for this change extends beyond bank staff and customers, encompassing the entire supply chain. Banks also have an important role to play in mobilizing private capital to support financing green investments and products.

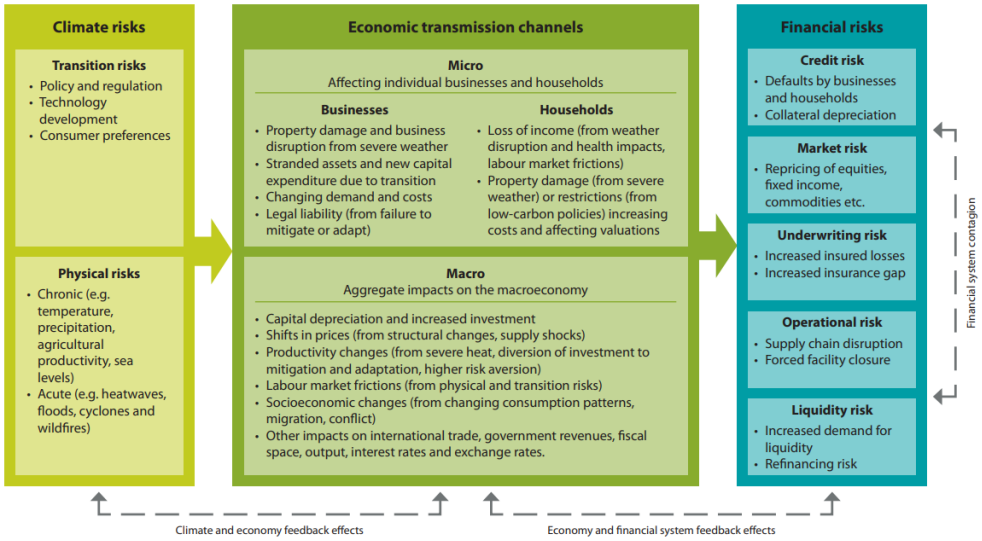
Small and medium-sized enterprises (SMEs) could adapt their strategies to climate risks more proactively. Many firms need to become more aware of how the transition or physical risks may impact them. So far, only a few of them are recognizing climate change as an opportunity. This pattern persists across large and small companies and extends to the public administration sector, where significant actions often fall short despite acknowledging the importance of addressing climate change. Markets outside Slovakia often demonstrate greater advancement in initiating innovative green investments and projects. Moreover, demand constraints often make support necessary for green startups in Slovakia to develop.

In Slovakia, green investments primarily stem from EU funding, underscoring the EU's influential role in shaping financial flows. Both regulation and financing originate from the EU, whereas national financing is relatively subdued compared to other EU countries. Public investments can act as a catalyst, attracting more private investments and making them a pivotal factor in decarbonization efforts. The Recovery and Resilience Plan (RRP) is Europe's most environmentally conscious and climate-responsible program. In Slovakia, the RRP allocates 46% of the 6 billion euros to support climate objectives, focusing mainly on buildings and construction —encompassing new construction and reconstructing existing structures. EU funding also contributes to raising public awareness about the importance of addressing climate issues, setting the stage for private investments.

2. Navigating Climate Risks in the Banking Sector

Banks' risk management needs to adopt to new, climate-related physical risks, such as floods or draughts, and transformation risks arising from policy responses to climate change. Risk management has become a cornerstone of financial stability in the banking industry. Financial institutions use scoreboards, stress tests, and statistical tools to handle market, liquidity, and credit risks. However, the emergence of climate change introduces new challenges, requiring a detailed examination of existing risk management tools and new, innovative forward-looking approaches. Integrating climate-related risks into the banking system raises fundamental questions about their interaction with climate, the economy, and financial risks.

Chart 2
From climate risks to financial risks



Source: NGFS

Understanding the transmission channels from climate to financial risks is essential (Chart 2). The Network for Greening the Financial System (NGFS) has collaborated with academics and practitioners to develop a set of scenarios providing a common reference framework for central banks, supervisors, and other stakeholders to assess the implications of climate-related risks to the financial system. Climate change risks include rising temperatures, rising sea levels, and more frequent and severe extreme weather events like floods, heat waves, and droughts. Two-thirds of Europe in 2022 was under extreme drought; we have seen the warmest ten years worldwide. According to the ESRB report[2] around 20% of firms in Slovakia could be subject to increased flood risk in the next 20 years, which ranks among countries with the highest risk in Europe. Large-scale natural disasters may lead to financial losses, collateral devaluation, and infrastructure damages. Addressing physical risks requires a proactive approach, for example, utilizing flood risk maps and incorporating them into collateral evaluations. Energy efficiency becomes another vital aspect impacting the collateral value of properties.

Transition risks are prominent in Slovakia, a highly industrial and energy-intensive economy. The historical reliance on energy-intensive industries such as steel, ammonium, and cement necessitates a major shift to reduce overall emissions. Bank lending and market

[2] ESRB (2021), Climate-related risk and financial stability.

financing regulation are crucial to facilitate this change. However, addressing these challenges requires more than regulatory measures. Collaboration between financial markets and government regarding fiscal policies and financial incentives is, e.g., essential to support climate initiatives. Moreover, the lack of comprehensive official data presents a substantial hurdle.

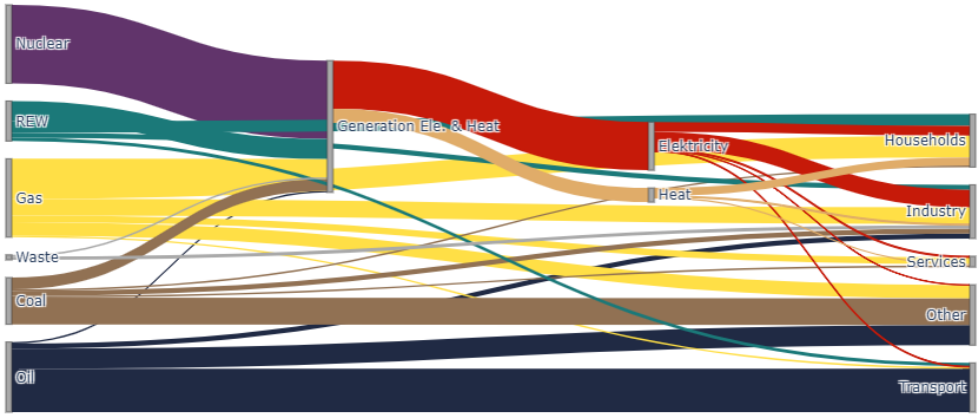
While navigating these challenges, opportunities arise. The Task Force on Climate-Related Financial Disclosures (TCFD) report[3] outlines possible positive effects, including resource efficiency, alternative energy sources, new markets, and infrastructure development. These are areas where banks can make a positive impact by targeted investments. Furthermore, they can lead by example, educate, and influence behavior change of their customers and business partners, and help companies, especially SMEs and micro-companies, manage and finance their transition.

The banking sector stands at a crossroads, facing unprecedented climate-related long-term challenges. By embracing adaptability and leading by example, banks can mitigate risks and actively contribute to a sustainable and resilient financial system. Fostering the collective effort of banks, regulatory bodies, and the supervisory environment is crucial in developing effective strategies and ensuring a smooth transition toward decarbonization.

3. Clean Energy Supply

Energy security is a cornerstone of both national and economic stability. For Slovakia, it is imperative to craft an optimal energy mix carefully, amplifying the role of renewable energy sources. Slovakia, like other landlocked nations in the region, was heavily reliant on Russian fossil fuels before the onset of the war in Ukraine in February 2022. These countries, notably less diversified within the European Union, face challenges in seeking alternative suppliers due to the absence of access to maritime routes. Moreover, grappling with infrastructure bottlenecks – including gas pipelines and oil processing facilities tailored for specific oil varieties – requires considerable technological investment for transformation.

Chart 2
Energy flows diagram, Slovakia, 2022



Source: European Commission, Energy balance

While Slovakia's current energy mix leans on nuclear energy and plays crucial role in its decarbonization efforts, ample room exists to decarbonize the energy sector by fostering renewable energy sources. The surge in energy demand, propelled by electric vehicles and the electrification of the steel industry, necessitates a strategic shift. Nuclear energy presently accounts for approximately 20 to 25% of Slovakia's energy production, in contrast to the global average of 4%. Beyond power generation, electrification – primarily through the adoption of

[3] TCFD (2017), Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures

electric vehicles and technologies such as heat pumps – plays a pivotal role in realizing the envisioned transformation. Despite Slovakia's current reliance on nuclear fuel from Russia, efforts are made to investigate alternative suppliers.

Forecasts indicate a substantial increase in electricity demand in the next 15 to 20 years, elevating the importance of nuclear power. The categorization of electricity generation into continuous, non-intermittent sources and those reliant on weather conditions underscores the need for strategic planning. Grid interconnection with neighboring countries – Poland, Czech Republic, Hungary, and Ukraine – necessitates medium and long-term investments to ensure a resilient grid.

Renewable energy sources for households, businesses, and public institutions offer a pathway to establish localized energy production, mainly through rooftop installations. Slovakia lags behind the European average of 23% by almost six percentage points in the share of energy from renewable sources. The primary obstacle to a large increase in renewables is electricity storage, with hydro pumps currently providing the only viable solution. Modernizing hydropower plants becomes imperative to enhance efficiency and adapt to climate change. While unsuitable for large-scale power generation, geothermal energy holds promise for urban heating.

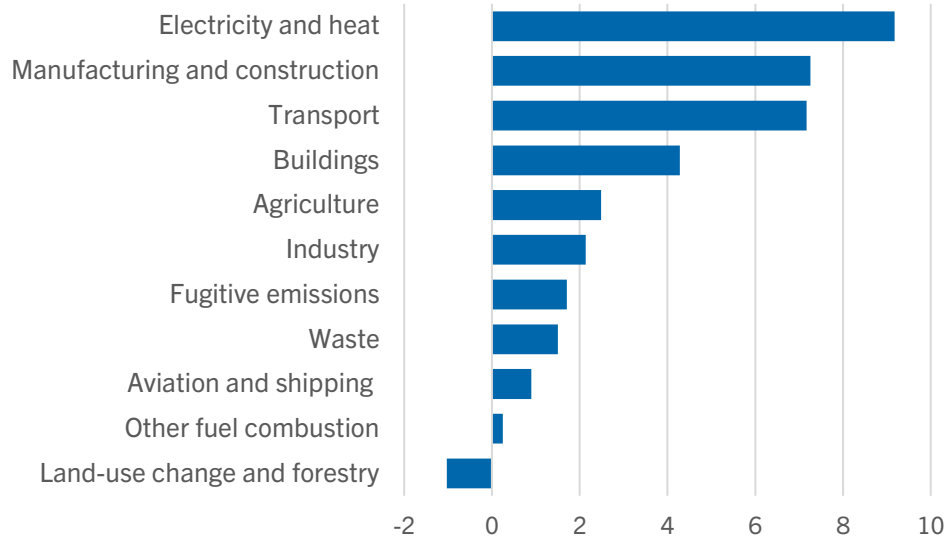
Oil is primarily used for transportation and plays a minimal role in power or heat generation. Transitioning to electric vehicles is expected to reduce oil consumption significantly. Diversifying gas sources remains a challenge due to Slovakia's landlocked status. Cooperation with European partners and diversifying gas supplies, including LNG alternatives, are critical for energy security. The unprecedented surge in energy prices after the start of the war in Ukraine has accelerated efforts to diversify alternative energy sources in Europe.

A collaborative dialogue among stakeholders is essential to determine Slovakia's future energy needs. This needs to address investments in renewables, their pace, locations, expected impacts, and necessary infrastructure enhancements. The overarching goal is to reduce dependence on fossil fuels, diversify fossil fuel imports, and expedite renewable deployment by streamlining regulatory processes. The long-term strategy focusing on decarbonization necessitates a well-balanced mix of various energy sources, focusing on strengthening grid infrastructure for efficient electricity transmission among European regions.

4. Sustainable Business

Sustainability emerges as a critical lens that shapes our evaluation of various sectors. Slovak emission-intensive sectors, significantly contributing to the country's GDP, face complex challenges, particularly in food and retail, oil, transport, and steel industries. Food and retail can chart their course through waste reduction and higher energy efficiency. At the same time, the decarbonization of the oil, automotive, and steel industries relies on electrification connected to sustainable energy sources.

Chart 4
Greenhouse gas emission by sector, Slovakia, 2020, million tons.



Source: Climate Watch (2023)

The food and retail sectors face sustainability challenges such as food waste and complex end-to-end supply chain operations. A staggering 40% of global food production goes to waste[4], while total food waste in Slovakia[5], on average, is 100kg per capita, significantly impacting biodiversity. The COVID-19 pandemic underscored the importance of food security, straining supply chains and impacting businesses. Pressure on decarbonization in the end-to-end supply chain is complex but essential.

In response to global geopolitical challenges, refineries diversify energy sources to reduce dependence on Russian fossil fuels. Diversifying fossil fuel inputs in refineries can be achieved by deploying technology focused on processing various crude oils, shifting from fuel production to a chemical-oriented approach, and exploring waste utilization for energy and chemical production. The transition is about decarbonization and necessitates community and government support.

The automotive industry contributes significantly to the Slovak economy but faces profitability challenges resulting from the shift towards greener business models. Manufacturing and production require substantial energy, often not from environmentally friendly sources. When producing a car, consideration must be given to the product's entire life cycle. The current market structure needs to incentivize substantial sustainability efforts for many businesses.

Despite being a substantial emitter, the steel industry has the potential to adjust. Moreover, stringent EU environmental standards create pressure to innovate to stand competitive compared to global counterparts. Decarbonization efforts, especially in high-polluting industries, require substantial investments. The largest polluter in Slovakia, transitioning from blast furnaces to electric arc furnaces, faces technical limitations and high capital and operational costs. Challenges such as scrap availability, legislation, and managing supply chains further complicate the process.

[4] IFCO, Global food waste by country: who's the biggest waster? https://www.ifco.com/countries-with-the-least-and-most-food-waste/
[5] Food waste and food waste prevention estimates: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Food_waste_and_food_waste_prevention_-_estimates#Amounts_of_food_waste_at_EU_level

5. Making Slovakia's Buildings Sustainable

The building sector considerably impacts global emissions and bears responsibility for a substantial share of energy consumption and greenhouse gas emissions. It is imperative to center attention on the energy-efficient design, construction, and operation of buildings, coupled with using low-carbon energy sources. Through its Recovery and Resilience Plan (RRP), Slovakia stands at a unique juncture to curtail energy usage by renovating publicly and privately owned buildings.

The primary challenge lies in existing buildings, the majority of which were erected between 1970 and 1990. Almost 80% of this housing stock is projected to remain in use until 2050, a period marked by carbon neutrality. Renovating these buildings presents a challenge due to structural limitations and heritage or preservation regulations. By contrast, newly constructed buildings frequently adhere to energy efficiency standards A and B of the Energy Performance Certificate (EPC) rating.

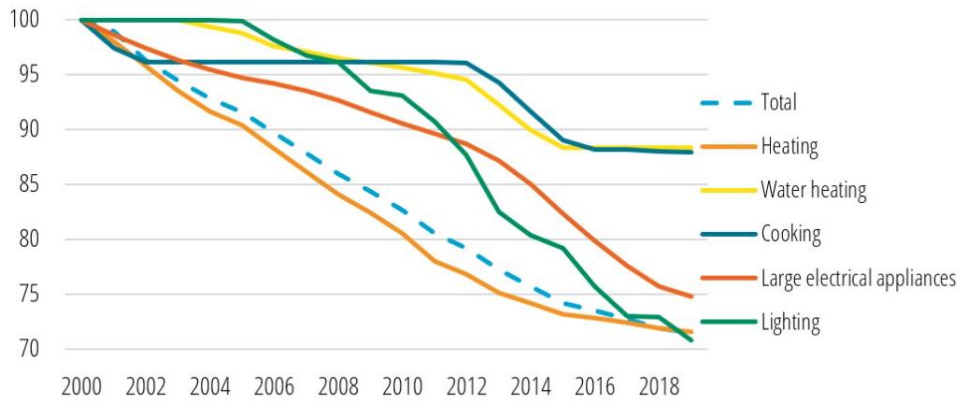
In 2021, approximately 40% of Slovakia's natural gas consumption, similar to the European Union average, went to households, primarily for heating[6]. Enhancing energy efficiency is pivotal to curbing emissions and reducing dependence on gas. Larger companies typically possess the capacity to improve their energy efficiency. Despite ample funding from the EU and others, the main barriers are more planning and projecting skills, especially in households, and the high initial investment. The poorest households struggle to afford improvements in energy efficiency due to insufficient savings for insulation or window replacement, coupled with challenges in obtaining bank financing. Human resource scarcity and administrative complexities hinder effective implementation, emphasizing the need for a streamlined process to access EU funds.

Targeted public policies, long-term financing programs, and technical assistance from entities like The Slovak Innovation and Energy Agency may help to surmount these barriers. Long-term programs are indispensable for sustained progress, mitigating the risks associated with sporadic funding. Technical assistance centers managed by the Slovak Innovation and Energy Agency are pivotal in guiding building owners through the intricate renovation process.

Addressing the carbon footprint in construction materials poses an evolving challenge, with the EU exploring methodologies to quantify and diminish embedded carbon. Integrating buildings into the Emissions Trading System (ETS) underscores the EU's commitment to emissions reduction. Revenues generated from the ETS for structures may contribute to the Social Climate Fund, designed to alleviate costs for vulnerable households and support sustainable building renovations.

[6] Eurostat, Energy balance flow: https://ec.europa.eu/eurostat/cache/sankey/energy/sankey.html?geos=EU27_2020&year=2022&unit=KTOE&fuels=TOTAL&highlight=_&nodeDisagg=0101000000000&flowDisagg=false&translateX=0&translateY=0&scale=1&language=EN

Chart 5
Trends in households energy efficiency at EU level, according to ODEX



Source: Odyssee

Addressing building-related green challenges faced by households and private companies is essential. Through strategic public policies, financial assistance, and innovative incentives, Slovakia can pave the way for climate-friendly buildings.

Conclusion

Slovakia's five aspects of green transition contain several important lessons for addressing climate change. First, the European Union is pivotal in the green transition process, notably through the Recovery and Resilience Fund, which is vital in financing climate priorities. Moreover, financial mediators have an essential role in mobilizing private money to support the funding of green investments and products.

Second, integrating climate-related risks into banks' risk management raises fundamental questions about the interaction between climate, the economy, and financial risks. Understanding the transmission channels from climate risks to financial risks is essential.

Third, for Slovakia, crafting a well-balanced energy mix is imperative to ensure energy security. While Slovakia's current energy mix leans on nuclear energy, ample room exists to decarbonize the energy sector by fostering renewable energy sources. Renewable energy sources for households, less energy-intensive businesses, and public institutions offer a pathway to establish localized energy production.

Fourth, profitability and lack of demand for green products are major hurdles impeding the swift penetration of sustainability in business. Some sectors can chart their course through waste reduction and higher energy efficiency, while others will rely on electrification connected to sustainable and stable energy sources.

Finally, focusing on the energy-efficiency design, construction, and operation of buildings coupled with low-carbon energy sources is essential. Recovery and resilience fund can facilitate energy efficiency within the private and public building sectors. However, administrative barriers complicate the access to funds. Targeted policies, long-term financing programs, and technical assistance may help overcome these barriers.

All five abovementioned aspects have a common need for collaborative efforts between the financial sector, the policymakers, comprehensive data, and skilled human capital across all domains.