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Women's Entrepreneurship in Climate Tech: Insights from Egypt, Morocco, and Tunisia

Middle East and North Africa
MENA Energy and Gender Program

ESMAP
Energy Sector Management Assistance Program

RENEW MENA

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The financial support from ESMAP is gratefully acknowledged. The Energy Sector Management Assistance Program (ESMAP) is a partnership between the World Bank and 18 partners to help low and middle-income countries reduce poverty and boost growth through sustainable energy solutions. ESMAP's analytical and advisory services are fully integrated within the World Bank's country financing and policy dialogue in the energy sector. Through the World Bank Group (WBG), ESMAP works to accelerate the energy transition required to achieve Sustainable Development Goal 7 (SDG7) to ensure access to affordable, reliable, sustainable, and modern energy for all. It helps to shape WBG strategies and programs to achieve the WBG Climate Change Action Plan targets.

1 ESMAP = Energy Sector Management Assistance Program.

RENEW MENA

The Regional Network in Energy for Women in the Middle East and North Africa (RENEW MENA) was launched as a collaborative platform in June 2022 by the World Bank, aimed at enhancing women's economic opportunities in the energy sector.

The goal of the platform is to boost women's role in energy by harnessing the recognized potential of women professional networks to access role models, provide and receive mentorship, build confidence, and create safe spaces. The initiative has three pillars:

1. The transition from science, education, mathematics, and technology (STEM) education to work
2. Recruitment, retention, and advancement
3. Entrepreneurship and financial inclusion with a focus on renewables and innovative technology.

This note is aligned with pillar 3 of RENEW MENA. The RENEW MENA initiative aims to directly support female entrepreneurs and other actors in the clean energy market ecosystem in the MENA region.

The World Bank acts as RENEW MENA's Interim Secretariat and is an active member of RENEW MENA's Steering Committee which comprises institutional and strategic partners including key actors from the public sector, academia, and private sector. As the Interim Secretariat, the World Bank monitors the program and facilitates coordination and collaboration among the Gender Focal Points of RENEW partners in the MENA region. The initiative is supported by ESMAP and the World Bank.

Since its inception, RENEW MENA as a network has institutional and strategic partnerships with national utilities, the private sector, and academia in MENA countries. It is also a growing network of individual members, currently with over 200 members.

Abbreviations

AFD	French Development Agency (*Agence Francaise de Developpement*)
AMEE	Agency for Energy Efficiency
CCG	Morocco Guarantee and SME Finance Corp
CCS	Carbon Capture and Storage
CDC	*Caisse des Dépôts et Consignations*
CNFCE	National Chamber of Women Entrepreneurs
DFI	Development Finance Institution
ESMAP	Energy Sector Management Assistance Program
ESO	Ecosystem Support Organization
FAST	*Femmes et Accélération pour les Start-ups et TPE*
FII	Moroccan Innovation Invest Fun
FIWAM	Financial Innovations for Women Affected by Migration
FSD	Financial Sector Development
GEM	Global Entrepreneurship Monitor
GIIN	Global Impact Investors Network
GIZ	German Agency for International Cooperation (*Deutsche Gesellschaft für Internationale Zusammenarbeit*)
GNI	Gross National Income
GoE	Government of Egypt
GOF	Green Outcomes Fund
IEA	International Energy Association
IFC	International Finance Corporation
ILF	Impact-Linked Financing
ILF for GIF	Impact-Linked Fund for Gender Inclusive Fintech
IoT	Internet of Things
IPO	Initial Public Offering
IRENA	International Renewable Energy Agency
IRESEN	Research Institute for Solar Energy and New Energies
JET	*Jeunesse, Entrepreneuriat, et numérique en Tunisie*
KfW	*Kreditanstalt für Wiederaufbau*
MASEN	Moroccan Agency for Sustainable Energy
MENA	Middle East and North Africa
MEPI	Middle East Partnerships Initiative
MSMEs	Micro, Small, and Medium Enterprises
NGO	Nongovernmental Organization
ONEE	National Agency for Electricity and Potable Water
R&D	Research and Development
RENEW	Regional Network in Energy for Women
SaaS	Software as a Service
SDC	Swiss Agency for Development and Cooperation
SIINC	Social Impact Incentives
SMEs	Small and Medium Enterprises
STEM	Science, Education, Mathematics, and Technology
TAM	*Taahil Al Mokawalat*
TEA	Total Early-stage Entrepreneurship
TIEC	Technology Innovation & Entrepreneurship Center
TNW	The Next Web
UAE	United Arab Emirates
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
VC	Venture Capital
WDI	World Development Indicators
We-Fi	Women Entrepreneurs Finance Initiative
WSMEs	Women-Owned Small and Medium Enterprises

Executive Summary

This note introduces initial findings on the potential of women's entrepreneurship in cleantech in Egypt, Morocco, and Tunisia. It draws on the limited research available at the intersection of gender, entrepreneurship, and climate tech and uses insights from interviews with ecosystem actors in Egypt, Morocco, and Tunisia to bring attention to the potential and multiple layers of opportunities offered by women's entrepreneurship in climate tech.[2] Insights from the field indicate that women entrepreneurs have the potential and interest to contribute more with solutions to both mitigating the impacts of the climate crisis and adapting to its immediate effects. The note does not aim to present exhaustive research and refrains from presenting conclusive recommendations. Instead, it suggests areas of further consideration for policy makers, investors, and ecosystem builders.

The focus of the note is directly aligned with the World Bank's mission to accelerate gender equality on a livable planet, with particular emphasis on women's leadership. The World Bank Gender Strategy calls on expanding and enabling economic opportunities for women and engaging women as leaders in decision-making, including in creating and adopting climate change solutions.[3] The strategy identifies innovating, financing, and acting collectively as drivers of change toward gender equality with leadership as a central pillar to effecting change. In this context, this note aims to draw attention to women's potential to contribute to innovation, how alternative approaches to finance may accelerate funding for women entrepreneurs, and how policy makers may consider using a holistic approach to promote women's contribution to achieving climate targets.

The Middle East and North Africa (MENA) region presents a unique opportunity in this context, with higher than global average of women enrolled in science, technology, engineering, and mathematics (STEM) fields, yet a much lower participation in labor force, and even lower in management and founding of companies. The average rate of female labor force[4] participation in MENA stands at only 21 percent,[5] well below the global average of 48 percent.[6] Additionally, overall entrepreneurial activity among women in MENA is less than 5 percent.[7] Yet, graduation rates of women in STEM-related fields in MENA average 53 percent, including 37 percent in Egypt, 45 percent in Morocco, and 55 percent in Tunisia.[8]

At the same time, the MENA region is witnessing a growing and sustained focus on addressing the climate crisis. According to the World Energy Transitions Outlook by the International Renewable Energy Agency (IRENA), the MENA region has the potential to derive almost 26 percent of its total primary energy supply from renewables by 2050, with the renewable share in the power sector possibly reaching 53 percent. Additionally, it is estimated that transition to renewable energy will generate over 11 million additional energy sector jobs by 2050.[9]

2 This note looks at the role of women in renewable energy, energy efficiency, and other relevant value chain from innovating of novel technologies to supporting their deployment and financing. The note uses the term climate tech to refer to the full spectrum of the value chain. More specifically, the term is used to refer to technologies designed to address or mitigate the impacts of climate change, such as innovations and solutions aimed at reducing greenhouse gas emissions, enhancing energy efficiency, promoting renewable energy sources, and supporting sustainable practices across various industries. Climate tech includes advancements in renewable energy (like solar and wind power), energy storage, carbon capture and storage (CCS), electric vehicles, and smart grid technologies, among others. For this note, the focus is limited to energy-related sectors and it does not address sustainable agriculture solutions, which may also be grouped under climate tech.
3 World Bank Gender Strategy 2024–2030: Accelerate Gender Equality for a Sustainable, Resilient, and Inclusive Future - Consultation Draft (English).
4 'Women not in labor force' refers to women who are not being paid for their valuable work. In the MENA region, women spend up to five times more time on activities related to domestic tasks and caregiving.
5 World Development Indicators, World Bank, last accessed October 8, 2023.
6 OECD. 2020. *Changing Laws and Breaking Barriers for Women's Economic Empowerment in Egypt, Jordan, Morocco and Tunisia*.
7 GEM (Global Entrepreneurship Monitor). 2022. *Global Entrepreneurship Monitor 2021/22 Women's Entrepreneurship Report: From Crisis to Opportunity.* London: GEM.
8 Share of graduates by field, female (%) (latest available data), World Bank Gender Data Portal. MENA average is adapted from United Nations Educational, Scientific, and Cultural Organization (UNESCO) Report 2021 based on 2017 data in select countries where available.
9 IRENA. 2018. *Global Energy Transition: Roadmap 2025.*

Yet few women participate across the cleantech value chain. According to a recent study by the World Bank, in Tunisia 28 percent of the workforce in clean energy is women. A deeper dive into the roles they occupy in Tunisia reveals that, while women hold 54 percent of administrative positions, they represent only 22 percent in technical roles and a scant 6 percent in managerial capacities.[10] In Egypt, the Government of Egypt (GoE) approximates that women make up 10 to 15 percent of those employed in the renewable energy sector. According to the same study, women account for only 14 percent of the workforce of renewable energy and energy efficiency companies. In Morocco, the representation of women in renewable energy companies stands at 24 percent, whereas in energy efficiency companies, it is notably higher at 44 percent. However, only 26.5 percent of these women hold positions as managers or engineers, and 19 percent work as technicians. This is in stark contrast to their male counterparts, of whom 53 percent occupy such roles.

Women's involvement in entrepreneurial efforts presents a high potential to increase the development and deployment of new solutions that accelerate transition to net zero. A recent World Bank study highlights that female innovators have the potential to be transformative leaders, offering novel solutions to global dilemmas, such as the climate crisis. However, they encounter obstacles in starting entrepreneurship and scaling their ventures.[11] The observations and suggested considerations of this note are aligned with three cross-cutting recommendations made in a World Bank Evidence and Practice Note on what works in supporting women-led businesses.[12] Specifically, interventions need to be better targeted to women entrepreneurs, they need to be designed to consider the multiple constraints faced by women entrepreneurs, and the differential needs of women entrepreneurs must be considered during program implementation, such as childcare support and convenient locations.

In this context, attracting private investments and mobilizing women's entrepreneurial potential in green cleantech are crucial for a successful energy transition and reaching global climate goals.[13] According to the International Energy Agency (IEA), to reach the Paris Agreement target of limiting global temperature increases to below 1.5°C, renewable investments need to reach US$1.3 trillion annually by 2030. The IEA estimates investments in energy in 2023 to be around US$2.8 trillion, with more than US$1.7 trillion going to clean energy, including renewable power, nuclear, grids, storage, low-emission fuels, efficiency improvements, and end use renewables and electrification.[14] Moreover, the transition from conventional to renewable industries is expected to generate around 24 million jobs by 2030.[15] Yet, the growth of renewable energy in global electricity generation faces challenges due to insufficient public funds; therefore, mobilization of private investments is a necessary imperative.

The energy sector's transition to greener and more sustainable future will require greater private sector participation, better inclusion of women, and more support for innovation and entrepreneurs. The high number of women graduates in the MENA region combined with the region's potential to transition to renewable energy presents an unparalleled opportunity to increase women's employment, leadership, and entrepreneurship in the energy sector. This assessment presents the entrepreneurship landscape in Egypt, Morocco, and Tunisia and explores practical entry points for boosting financing to support women-owned businesses in sectors related to clean energy transition.

Key Areas of ConsiderationFostering entrepreneurship involves a holistic approach that encompasses the entire entrepreneurial journey. An entrepreneur's journey, from ideation and launching a business to attracting seed capital, developing a product, scaling market penetration, and raising new funds, requires distinct types of support. For this journey to be successful, it is essential to build entrepreneurship into education programs, have appropriate support organizations and financial structures, and provide continuous skills development tailored for women in the targeted sectors. The note aims to provide areas of consideration for policy makers, investors, and ecosystem support organizations (ESOs) to address the needs across the entire journey.

10 Sarkar, A., and T.C. Nguyen. 2023. *The Employment Benefits of a Clean Energy Transition in MENA.* , World Bank.
11 Ubfal, Diego Javier. 2023. What Works in Supporting Women-led Businesses? World Bank.
12 Ibid.
13 World Bank. 2023. *Catalyzing Private Investments and Climate Finance to Turn Energy Transition Ambitions to Reality.*
14 IEA. 2023. *World Energy Investment 2023.*
15 Briter Bridges. 2022. *Adapt, Mitigate and Grow: Climate Tech in Africa*.

This note looks at the intersection of entrepreneurship, climate, and gender and identifies both common (generic) and more tailored consideration areas specific to gender and climate tech. The common (generic) considerations for fostering entrepreneurship are related to non-gender and non-climate tech-specific areas while the gender and climate tech considerations are tailored for women entrepreneurs and those in climate tech. While common considerations are non-tailored, addressing these would implicitly have a positive impact on women's entrepreneurship in climate tech.

While detailed suggestions categorized by generic, gender, and climate tech considerations are presented in Annex I, below is a summary of the key findings and considerations (combining generic and specific) that together take a holistic approach to supporting women's entrepreneurial journey identified under the specified objectives:

A. Creating an enabling environment through multistakeholder engagement and private-public partnerships:

- Low levels of women's entrepreneurship, including in climate tech, stem from a multitude of reasons, including complexities inherent to the climate sector, risks associated with early-stage investments, limited availability of financing, absence of tailored support structures for women, and societal norms. **Therefore, a coordinated and holistic approach is required to facilitate women's involvement, which calls for actions from policy makers, support organizations, educational institutions, investors, and women.**

- The coordination between the private sector and government to harness the potential of women entrepreneurs in climate tech, especially among STEM graduates, remains weak. A **comprehensive approach that looks at the entire journey of an entrepreneur**, from education to ideation, from starting a business to raising capital, from growing a business to exits for investors, is needed.[16]

- **A supportive environment that nourishes entrepreneurship addressing the interplay of formal and informal factors is critical.** The need for refining formal structures, such as policy frameworks that encourage female participation in the sector and market structures that are receptive to their ventures, was highlighted. Equally crucial are the informal norms that can play a significant role in shaping entrepreneurial aspirations.

B. Designing tailored support and capacity building that respond to women's specific and regional needs as entrepreneurs:

- Support programs fall short of recognizing and accommodating women's dual care work responsibilities. **To address this, programs should offer flexible working hours, convenient locations, easy transportation options, and childcare facilities.**

- Support programs for women entrepreneurs are available but require further tailoring to address specific needs. **Customized learning paths, mentorships, enhanced access to networks, education on mental health, and training in public speaking are essential components of this tailored approach.** Regional considerations are also important aspects to address.

16 An 'exit' in the context of early-stage investment refers to the method by which investors realize a return on their capital. Common exit strategies include trade sales, initial public offerings (IPOs), mergers or acquisitions, secondary sales, buybacks, or, less desirably, liquidation. These strategies are crucial for investors to convert their investments into cash. Successful exits not only provide financial returns but also reinforce the cyclical nature of investment, fostering continued innovation and entrepreneurship.

C. Customizing investment pathways that are context appropriate and build a culture of women as leaders:

- Existing investment models in the three countries, as is the case in most of the world, are based on the Silicon Valley venture capital (VC) and angel investment models, which often overlook businesses without 'unicorn'[17] potential and are ill-suited for many countries outside of the original context (such as the United States). **Alternative investment structures, such as revenue-based financing, are needed to better align with local realities.**

- While the presence of women in ESOs is prevalent, women's presence in the investment scene, such as in leadership positions, is far behind that of men. **Having a higher number of women and in more senior positions in the investment sector will be critical to promote women's entrepreneurship.**

- Promoting women's entrepreneurship extends beyond solely championing women founders. Also, **it is important to broaden support to all women in startup culture and foster opportunities for them as technical staff and senior leaders within startups to cultivate an environment where they can firsthand witness the entrepreneurial landscape,** recognize opportunities, and envision their potential to innovate.

D. Boosting recognition of women as role models and fostering a pipeline of young innovators in climate tech:

- The presence of female role models in entrepreneurship has been empirically linked to the aspirations and achievements of younger generations, yet limited attention is paid to the importance of female role models in the industry.[18] **Promoting and highlighting female role models in entrepreneurship becomes a pivotal strategy for encouraging more women to consider this career path.**

17 A 'unicorn' in the realm of early-stage investments refers to a privately held startup company that achieves a valuation of US$1 billion or more. The term was coined by venture capitalist Aileen Lee in 2013, drawing on the rarity of such successful ventures. Unicorns are often seen as a benchmark for startup success, representing both significant growth potential and validation of the company's business model in the eyes of investors.

18 Karimi, S., Biemans, H., Lans, T., & Chizari, M. 2013."Understanding Role Models and Gender Influences on Entrepreneurial Intentions among College Students." *Procedia - Social and Behavioral Sciences* 93: 204–214.

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1. Introduction

Egypt, Morocco, and Tunisia have significant renewable energy potential and a high ratio of women graduating from science, technology, engineering, and mathematics (STEM) fields of study.[19] According to the World Bank, the graduation rates of women in STEM-related fields in Egypt, Tunisia, and Morocco are 37 percent, 55 percent, and 45 percent, respectively.[20] As such, all three countries possess significant opportunities to create multiple layers of impact by pushing forward women's participation in the energy sector and more specifically entrepreneurship in related sectors. These layers of impact include, among others, climate, economic impact through a faster transition to renewable energy, social impact through women's empowerment in business and society, and economic development through increased entrepreneurial activities and employment.

However, there is a notable gender gap in women working in STEM-related positions due to a combination of reasons.[21] In a study by the International Renewable Energy Agency (IRENA), among the barriers to women's participation in STEM jobs in renewable energy, cultural and social norms were cited as a significant obstacle by 72 percent of respondents. About 49 percent of respondents highlighted the lack of gender-sensitive policies, while 41 percent cited a lack of gender-specific training opportunities as a barrier. Additionally, 71 percent of respondents emphasized the importance of prioritizing access to training and skills development for women.[22]

19 These three pilot countries were selected for this note due to their active engagement as RENEW MENA partners. RENEW MENA is a regional platform financed by the Energy Sector Management Assistance Program (ESMAP) and the World Bank and focuses on three pillars: (1) Facilitating STEM education-to-work transitions, (2) Advancing recruitment, retention, and advancement, and (3) Promoting entrepreneurship and financial inclusion.

20 World Bank Gender Data Portal. "Share of Graduates by Field, Female (%)" (latest available data). Accessed October 2023.

21 World Bank. 2021. *Toward More and Better Jobs for Women in Energy.* Washington, DC: World Bank.

22 IRENA. 2019. *Renewable Energy: A Gender Perspective.* Abu Dhabi: IRENA.

The note's focus on Egypt, Morocco, and Tunisia that possess distinctive characteristics and experiences offers valuable insights into the various challenges faced by women in Middle East and North Africa (MENA) and the potential opportunities available to them in the energy sector. While these three countries share a similar socioeconomic context, they differ in policy frameworks, institutional support, cultural norms, and existing initiatives promoting women's entrepreneurship.

The objective of this note is to shed light on the status of women's entrepreneurship in climate tech companies including renewable energy, energy efficiency, and digitalization, drawing from the contextual developments and experiences from Egypt, Morocco, and Tunisia. It analyzes the ecosystem of women's entrepreneurship, focusing on the barriers hindering women's full participation. The note utilizes the background of these three countries to identify common themes rather than providing a direct comparison. The note individually examines the landscape of women's entrepreneurship in each country, with a focus on renewable energy depending on data availability. It also looks at shared issues across countries. By capturing the challenges, opportunities, and best practices, it aims to provide insights and recommendations to foster an enabling environment for women entrepreneurs in climate tech.

> "Tunisia has a lot of female engineers, but they are nowhere to be found in the startups or in the entrepreneurship community. We need to help them understand their skills and how they can add value. They can have a stable salary."
>
> **Tunisia, Accelerator Executive**

Furthermore, the focus of the note is directly aligned with the World Bank's mission to accelerate gender equality on a livable planet, with particular emphasis on women's leadership. The World Bank Gender Strategy calls on expanding and enabling economic opportunities for women and engaging women as leaders in decision-making, including in creating and adopting climate change solutions.[23] The strategy identifies innovating, financing, and acting collectively as drivers of change toward gender equality with leadership as a central pillar to effecting change. In this context, this note aims to draw attention to women's potential to contribute to innovation, how alternative approaches to finance may accelerate funding for women entrepreneurs, and how policy makers may consider using a holistic approach to promote women's contribution to achieving climate targets.

The note's methodology integrates data and information from desktop research, publicly available datasets, and stakeholder interviews. The intersection of entrepreneurship, gender, and climate is relatively nascent in the MENA region, and as such, there is a scarcity of literature that centers on this intersection as its primary focus. Therefore, the data analysis was conducted through a literature review of secondary sources and collection of new data through qualitative interviews (see Table 1). The interviews conducted as part of this study were intended to collect information regarding the entrepreneurship ecosystem, obstacles for investment and growth, and potential opportunities. They aimed to gather firsthand insights and experiences from the interviewees, which were analyzed and used to interpret in more depth numerical and desktop research data for a more comprehensive understanding.[24]

> "There are more women trained in engineering, but they end up having to choose prioritizing personal life, and this results in more men in the entrepreneurial scene. We end up losing amazing profiles because women do not want to take risks with their personal lives."
>
> **Tunisia, Venture Builder**

23 "World Bank Gender Strategy 2024–2030: Accelerate Gender Equality for a Sustainable, Resilient, and Inclusive Future - Consultation Draft" (English).
24 In line with the World Bank data privacy policy, the interviews were undertaken with the understanding that participant identities would be kept confidential, which is why a list of the contributors is not included in the note.

Table 1: Data Collection Process

Primary Research	
Key informant interviews/semi-structured discussion with startups, incubators, accelerators, investors, and other ecosystem actors in Egypt, Morocco, and Tunisia	Over 90 individuals were identified and contacted through various outreach, and 28 have been successfully interviewed—10 respondents in Egypt, 9 in Morocco, and 9 Tunisia.
Online survey targeting women entrepreneurs, entrepreneurs within the energy sector, or those with expertise in renewable energy and gender equality	Survey response rates fell below intended levels and consequently have not been employed to derive conclusions.
Secondary Research	
Grey literature including gender and sector-specific reports, policy papers, and industry documents by public agencies, private institutes, and international/ regional organizations	
Development databases including, World Development Indicators (WDI), Enterprise Surveys, FINDEX, and ILOSTAT	
International, regional, and local media scans (publicly online or based on network referrals)	

The study aimed to address the following essential questions:

a. What support is the existing ecosystem able to offer to women's entrepreneurial activities in these fields, and what can it do better?

b. What are the barriers, whether perceived or actual, holding back women from starting entrepreneurial activities in renewable energy, energy efficiency, and related fields?

c. What does the current landscape for early-stage investments look like, what are the investors' primary concerns, and what is the potential of alternative investment structures to accelerate funding for women entrepreneurs?

As part of the research for the note, the team also prepared a detailed mapping of the ecosystem in the three countries.[25] The mapping exercise was conducted incorporating findings from publicly available data and desktop research and identified 178 organizations comprising investors, startups, accelerators, and other ecosystem support organizations (ESOs). The map is intended to be a living document and a live resource offered by RENEW MENA.

The note is structured as follows: Chapter II provides an overview of the renewable energy landscape with a focus on the three countries. Chapter III focuses on the opportunities and challenges women entrepreneurs in the sector face. Chapter IV presents four case studies of innovative impact financing structures that may increase funding for women entrepreneurs and accelerate their growth and contributions to transition to renewable energy. Finally, Chapter V presents key considerations to support women entrepreneurs (in the climate tech sector and more generally), followed by an annex providing greater details categorized by different stakeholders. The note shares feedback and insights from the interviews throughout the various sections to supplement findings from desktop reviews.

25 RENEW MENA Ecosystem Mapping of Egypt, Tunisia and Morocco of Renewable Energy Startups, Investors and Ecosystem Support Organizations.

II. Landscape of the Entrepreneurship Ecosystem with a Focus on Climate Tech

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In the MENA region, and as such in Egypt, Morocco, and Tunisia, women's entrepreneurship remains a largely untapped source of innovation and economic development. While one out of every three women in MENA has intentions to start her own business, only 3.2 percent of women end up with their own businesses.[26] Furthermore, women in the MENA region are only half as likely as men to engage in early-stage entrepreneurial activities. A 2017 study by the Global Entrepreneurship Monitor (GEM)[27] found that the female-to-male ratio of the total early-stage entrepreneurial activity (TEA)[28] in MENA was 0.52 (see Table 2), the lowest globally. This disparity highlights the need for change and presents untapped economic growth opportunities.

26 GEM 2022.
27 Ismail, A., Schøtt T., Herrington, M., Kew, P., & De la Vega, I. 2017. *GEM Middle East and North Africa Regional Report 2017*. Global Entrepreneurship Research Association.
28 TEA is an index developed by the GEM, representing the percentage of 18–64 population who are either a nascent entrepreneur or owner-manager of a new business.

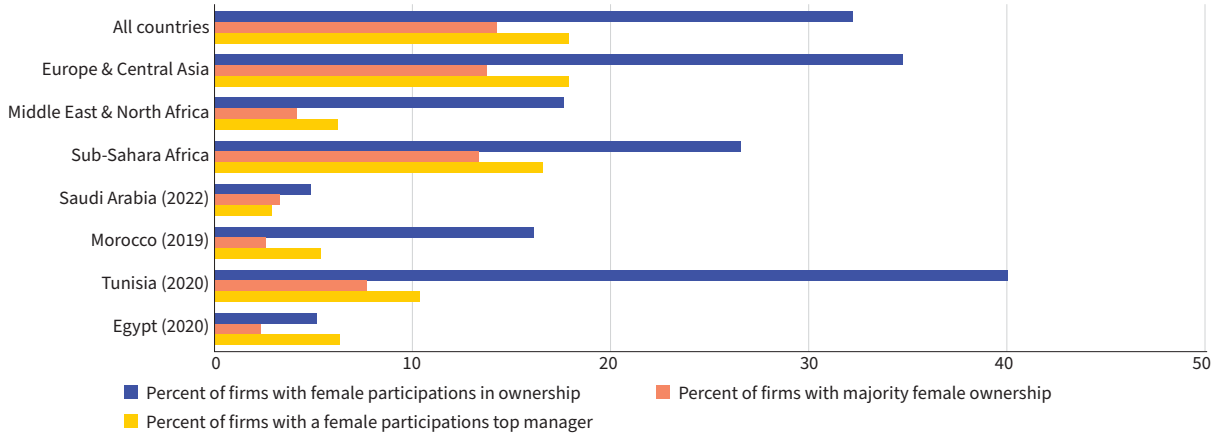
Table 2: Total Early-Stage Entrepreneurial Activity

	Male TEA rate (as % of adult male population)	Female TEA rate (as % of adult female population)	Female to male ratio
Egypt	20.9*	7.5	0.36
Iran	16.6	8.9	0.54
Jordan	12.8	3.3	0.26
Lebanon	26.2	16.1	0.61
Morocco	6.7	4.5	0.67
Qatar	8.1	6.8	0.84
Saudi Arabia	12.9	9.7	0.75
Tunisia (2015)	15.0	5.3	0.35
UAE	6.6	3.7	0.56
Average (MENA)	14.0	7.3	0.52
Regional averages			
Africa	24.8	20.9	0.84
Asia & Oceania	12.7	8.8	0.69
Latin America & Caribbean	21.6	17.5	0.81
Europe	10.9	6.1	0.56
North America	17.5	11.9	0.68

Source: Global Entrepreneurship Monitor 2022/2023.

Women's ownership of firms is low compared to global and regional averages except for in Tunisia, but women's ownership is not seen as a healthy proxy for women-led businesses. Women-owned firms in Tunisia rank significantly higher compared to global and regional averages. Data on businesses with majority women ownership and percentage of firms with woman top managers shed more light on the situation (see Figure 1). The contrast of the high ratio of women-owned firms with low levels of TEA (Table 1) demonstrates the weakness of using women ownership as a proxy for entrepreneurial activity.

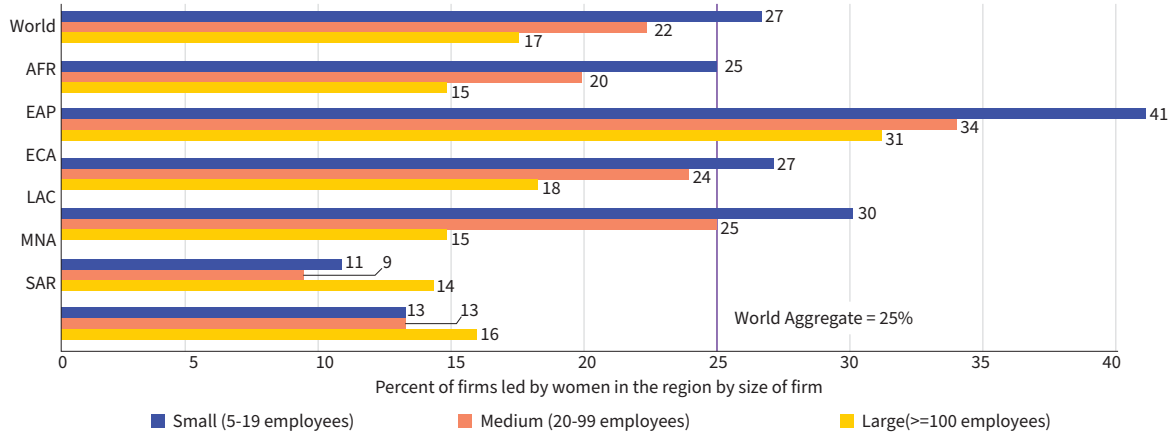
Figure 1: A Comparative Perspective: Share of Firms Owned and Managed by Women



Source: World Bank Enterprise Surveys, last accessed in July 2023. Source data year varies by country as indicated in the chart.

All three countries rank low on the percentage of firms with a female top manager compared to global and African averages, though they appear to be on par with the MENA average. The percentage of firms with a top female manager in Egypt is 6.3 percent, 5.4 percent in Morocco, and 0.4 percent in Tunisia.[29] The MENA region also ranks significantly behind other regions when it comes to the percentage of formal firms led by women and the size of these businesses (Figure 2).

Figure 2: Percentage of Formal Firms Led by Women by Region and Firm Size



Source: Ubfal, Diego Javier. 2023. *What Works in Supporting Women-led Businesses?* Washington, DC: World Bank. http://hdl.handle.net/10986/38564

An analysis of policies in these three countries indicated positive efforts toward increasing female entrepreneurship. Efforts are made to support and empower women entrepreneurs in the region. One example is the manifesto issued by Tunisia's National Chamber of Women Entrepreneurs (CNFCE) calling for realizing women's entrepreneurial potential.[30] The manifesto proposes a vision in the government's program to unlock and develop female entrepreneurship. Furthermore, a 'National Strategy for the Promotion of Female Entrepreneurship in SMEs[31] by 2035' is under way, supported by the 'Qualification and Labour Market (FORMAT)' initiative in Tunis.[32] Egypt's National Strategy for the Empowerment of Egyptian Women 2030 Vision[33] notes that media, information, and communication technology are growing sectors that can advance gender equality and underlines that women can play a significant role in sustainable energy management, reducing energy consumption and promoting renewable energy. The strategy recognizes that representation of women in renewable energy production is limited. The Egyptian National Council for Women has also partnered with local and international organizations to foster women's entrepreneurship.[34] Morocco has also recognized the untapped potential and importance of women's entrepreneurship and, with both local and international donor support, has undertaken different initiatives to encourage women's participation in the ecosystem. Morocco issued a law in 2020 introducing the auto-entrepreneur status which encouraged women entrepreneurs to formalize their entrepreneurial activities and improve their access to finance. The initiative also introduced a national support and financing program that provides a range of products with a preference for rural areas.[35]

29 World Bank Enterprise Survey. 2022, Accessed October 2023.
30 CNFCE Manifesto. Accessed on October 2023.
31 SMEs = Small and medium enterprises.
32 GIZ. 2023. *Strengthening Women as a Future Pillar of the Tunisian Economy*.
33 National Council for Women. 2017. *National Strategy for the Empowerment of Egyptian Women 2030 Vision and Pillars*.
34 American University in Cairo. UN Women Women's Economic Empowerment Entrepreneurship Support Program (Rabeha).
35 ICTD (International Center for Tax and Development). 2021. *Informal Work and Auto-Entrepreneurship Laws in the Maghreb: What can Tunisia learn from Morocco?*

While respondents from all three countries agreed that the overall entrepreneurial ecosystem is conducive for women's engagement, gender gaps in female entrepreneurship remain. Discussions indicated that all three countries offer a conducive environment that aims to promote and enable women's active engagement in commercial activities, including establishing businesses, contractual agreements, and collaboration with financial institutions. However, women's participation in labor force and even more so in the entrepreneurship ecosystem lags significantly behind that of men.

The geographical positioning and entrepreneurial climates in Egypt, Morocco, and Tunisia have contributed to an increase in attracting international entrepreneurship players. Notably, Egypt has attracted the establishment of several international venture capital (VC) firms such as 500Capital, a US VC firm. North Africa has become a hub for both regional and international accelerators, exemplified by the launch of Plug and Play's innovation center in Morocco in 2020 and the opening of Endeavor and Flat6Labs offices in Tunisia in 2016.[36] The financial sector has also seen growth, with multiple investment banks initiating operations in the region. Additionally, global technology corporations such as Google, Salesforce, and Microsoft have commenced operations in these countries, testifying to the overall talent in the technology sector and its potential. Most recently, Bpifrance, the French Public Investment Bank, inaugurated its North African office in Morocco in 2021. This trend of internationalization is also generating interest in the local talent pool.[37]

> **"In Cairo, highly educated women have close to no barriers to become entrepreneurs. If I am a highly educated woman, through my network, family access to investment - then I can have a business... but going further from Cairo - that's not the case."**
>
> **- Egypt, Business Incubator Executive**

Entrepreneurship in Climate Tech

Investors and entrepreneurs associate renewable energy-related startups with higher commercial risks. Most interviewees shared the perception that energy-related entrepreneurial activities, including renewable energy and energy efficiency, pose higher risks compared to less research and development (R&D)-intensive ones and sectors with easier market entry, such as e-commerce and fintech. The associated higher risks in energy-related startups compared to other sectors reduce the interest of both entrepreneurs and investors in this field.

Several characteristics of renewable energy investments appear to lead to this shared perception of higher risk. Some of these characteristics are long payback periods, high up-front capital expenditure investment requirements, uncertainties related to R&D results, and their asset-heavy nature (unlike asset light companies, such as software-as-a-service [SaaS] companies). These characteristics make the sector significantly riskier for both entrepreneurs and investors. The required up-front capital and technical knowledge are considerably higher compared to other fields, making it a niche and complex area to enter.

> **"Energy companies require significant up-front capital. And women already want to play small and have difficulty investing. Energy is a hard area to start with, and even harder for women."**
>
> **Woman Investor, Egypt**

36 Flat6Labs in Tunisia portal. Available at: https://www.flat6labs.com. Accessed October 2023.
37 Sarangé, C., Murima, J., Saunders, D., Inoubli, A., & With, L. 2022. *Innovation And Investment In North Africa.* Briter Bridges.

Even those who choose to focus on energy-related sectors for their entrepreneurial activities limit themselves to asset-light options to reduce their investment risk. One of the reflections of perceived and real risks within the energy sector is that within the broader climate tech sector, most entrepreneurs who decide to enter this sector choose to focus on building companies offering asset-light solutions, such as energy efficiency software or products and services related to internet of things (IoT),[38] shying away from hardware-related solutions. Although this is not necessarily a negative development, opportunities in asset-heavy areas should not be neglected, and pathways to their development should be explored.

> **"If I were the president, I would ease the procedures for registration and prioritize those who are responsible for their families."**
>
> **Egypt, ESO Executive**

Except for Egypt, cost of starting a business is significantly below the global average of 19.4 percent of gross national income (GNI) per capita. The cost of business startup procedures is comparatively low in Tunis and Morocco, accounting for 2.9 percent of GNI per capita and 3.6 percent, respectively.[39] In Egypt, the cost of business startup procedures has a high percentage at 20.3 percent of GNI per capita.

Borrowing for business is also significantly lower among women compared to men. The share of women borrowing for business in Egypt, Morocco, and Tunisia is low at 1.6 percent, 0.7 percent, and 3.1 percent, respectively, compared to the rates for men, which are higher, at 4.9 percent, 1.9 percent, and 9.5 percent, respectively.[40]

Overview of the Ecosystem in Egypt

In 2022, Cairo's startup ecosystem demonstrated robust growth despite global challenges. The city attracted US$517 million in investments, a 3 percent increase from the previous year, and recorded 160 closed deals, the highest in the MENA region.[41] Egypt holds the distinction of having the largest startup ecosystem in North Africa and ranks among the top four such ecosystems across the African continent.[42] Key sectors that have attracted both a high number of startups and significant funding include e-commerce, logistics, and fintech.

Cairo, as the third most populous city in Africa and the sixth globally, serves as the epicenter of Egypt's startup activity. The city is the base for several of the nation's most well-funded startups, such as MNT-Halan, Fawry, Swvl, MaxAB, Trella, and Vezeeta (a United Arab Emirates (UAE)-based Egyptian-founded startup). Notably, Swvl, an Egyptian bus-hailing startup valued at US$1.5 billion, became the first startup from North Africa to be listed on Nasdaq in June 2022. However, subsequent significantly poor public market performance and the possibility of becoming delisted create concerns among investors for similar future opportunities. With 93.6 percent of Egypt's startups based in Cairo, the city experienced most of the startup activity. Cairo's rising importance was reflected in its improved ranking in the Emerging Ecosystems of Startup Genome, moving from the 71–80 range to the 51–60 range in the ranking for 2022.[43]

38 The IoT in renewable energy, energy efficiency, and climate tech refers to the interconnected nature of devices and systems that optimize energy use, monitor environmental conditions, and enhance sustainable practices. Emphasizing asset-light solutions, IoT allows startups to deploy innovative technologies without heavy infrastructure investments. This approach is attractive due to its low barriers to entry and reduced capital expenditure needs, enabling nimble and cost-effective innovations in the green tech space.
39 World Bank Gender Portal. "Cost of Business Start-Up Procedures (% of GNI per capita), World Bank." Accessed October 2023.
40 Ibid. Borrowed to start, operate, or expand a farm or business, World Bank. Accessed October 2023.
41 Startup Genome. 2023. *Egypt Country Overview*.
42 Saranga et al. 2022
43 Startup Genome. 2023. The Global Start Up Ecosystem Report: Emerging Ecosystems Ranking.

Cairo has also witnessed significant developments in terms of international partnerships and initiatives. American VC Fund 500 Global opened its first Africa office in Cairo and launched programs to support Egyptian startups. The United Nations Development Programme (UNDP) plans to establish a US$1 billion startup financing facility for Africa,[44] including a hub in Cairo (and Casablanca). Tech Mahindra, an Indian multinational, signed an agreement to establish a global delivery center in Cairo, creating more than 1,000 job opportunities,[45] mostly in digital transformation, including in the energy sector.

Various high-profile events and initiatives have contributed to Cairo's thriving ecosystem. The Smart Cities cohort of Plug and Play Egypt welcomed 25 startups in 2022. Algebra Ventures, a VC firm, closed the first round of its US$100 million Egypt-dedicated fund. The Technology Innovation and Entrepreneurship Center (TIEC),[46] together with The Next Web (TNW), organized Hangout in July 2022 with VCs in Cairo, and the Startups Without Borders and Innovation Summit organized its fourth gathering in 2023, bringing together thousands of attendees. These achievements highlight Cairo's growing prominence as a hub for innovation and entrepreneurship in the region and its sustained efforts to expand its local and global presence in the startup ecosystem.[47]

Alexandria also has a burgeoning startup scene. Alexandria follows Cairo, featuring recently funded enterprises like Tawfeer Market in the grocery sector and ZR3i.COM in agrotech. Investment hubs and investor groups, such as Startups of Alex and Alexandria Angels, also contribute to Alexandria's vibrant startup environment according to Startup Genome.

Overview of the Ecosystem in Morocco

Morocco has a growing entrepreneurial ecosystem and ranks third in the Northern Africa Global Startup Ecosystem Index, according to Startup Blink, a private market intelligence company.[48] In 2022, investments amounting to US$30 million were made in the startup ecosystem in Morocco, the highest ever for the country.[49] Moreover, the startup creation rate has also grown enormously, with 60 percent in the last six years.[50] Morocco's thriving startup ecosystem saw the creation of 93,272 companies in 2022.[51] One of the **significant** industries of growth is the renewable energy sector. Morocco used renewable energy sources to generate 38 percent of its electricity in 2022. A survey by the Emirati Energy platform showed that the country is one of the top five in the MENA region in terms of solar energy production. Furthermore, the United Nations' Global Investment for 2023 stated that Morocco was among the top 10 developing nations that received significant foreign investment in renewable energy from 2015 to 2022.[52]

Entrepreneurship among women in Morocco remains limited, despite its vital role in enhancing women's economic empowerment and their contribution to national wealth generation. As per the Moroccan Observatory of the Very Small, Small and Medium Enterprise (OMTPME), in 2019, women accounted for only 16.2 percent of business leaders across all sectors. Women-owned business faced challenges that originated from limited access to entrepreneurial opportunities, and the COVID-19 pandemic further exacerbated these challenges. Approximately 12 percent of the total businesses that ceased operations due to the crisis were owned by women, in contrast to 6 percent of men-owned businesses.[53]

> **"Few years ago, large companies were not interested in working with a local startup in Morocco, they would rather work with a European company, charging them 10 times more. Now they are changing their perspective."**
>
> **Morocco, Ecosystem builder**

44 UNDP. 2022. *Timbuktoo: A Pan-African Hub for Startup Growth.*
45 Tech Mahindra. 2022. *Tech Mahindra to Establish its First Global Delivery Center in Egypt.*
46 TIEC/TNW. Hangout with VCs - Cairo 2022: https://egyptinnovate.com/en/news/hangout-vcs-boutique-matchmaking-event-tnw-and-itida. Accessed October 2023.
47 Start-up Genome website: https://startupgenome.com/ecosystems/cairo
48 StartupBlink. 2023. Startup Ecosystem of Morocco, StartupBlink: https://www.startupblink.com/startup-ecosystem/morocco
49 Belych, Lofty. 2023. *Morocco Startup Ecosystem 2023: Entering A New Phase*. Accessed on LinkedIn.
50 Ibid.
51 Statista website. Number of new businesses created in Morocco from 2015 to 2022. Accessed October 2023.
52 North Africa Post.2023. *MENA: Morocco in Top Five States Generating Electricity from Solar Power; Third Developing Country Attracting Most Investments in Green Energy.* July 10, 2023.
53 Ministry of Finance and Economy, Kingdom of Morocco. 2023. *Synthesis of the 2023 Edition of the Gender Responsive Budgeting Report.*

Programs (such as Innov Invest Fund by Morocco Guarantee and SME Finance Corp [CCG], German Agency for International Cooperation [*Deutsche Gesellschaft für Internationale Zusammenarbeit*, GIZ], Taahil Al Mokawalat [TAM] 3 project, and Middle East Partnerships Initiative (MEPI) Local Grants Program of the United States Embassy)[54] introduced in recent years continue to empower the startup ecosystem in Morocco, ensuring its growth in the following years (see Box 1). With programs such as Green Innoboost[55] targeting directly the development of climate tech solutions, Morocco has the **potential** to become a significant player in the global renewable energy market. Furthermore, the young population (with a median age of 29)[56] and high female STEM graduate ratio of 45.3 percent[57] in Morocco highlight the potential of untapped women's entrepreneurship talent in the country. The government has implemented policies such as the 2009 National Energy Strategy, 2030 Renewable Energy Target, and Renewable Energy Developmental Law and introduced incentives such as grants, tax incentives, and free zone status to attract foreign investment and promote the growth of its renewable energy industry.[58] The Moroccan Innov Invest Fund (FII), initiated in 2017 by the Morocco Guarantee and SME Finance Corp (CCG) and backed by the Moroccan government, the World Bank, and the European Union, aims to improve financial accessibility for SMEs and startups, positioning Morocco as a regional center for innovative entrepreneurship.[59] FII channeled equity, grants, and interest-free loans via four VC funds and 16 incubators and accelerators to fund 300 startups in three years.[60]

Box 1: Moroccan Government Programs for Fostering Women's Entrepreneurship and Employment

The Ministry of Solidarity, Social Integration, and the Family, in collaboration with UN Women and various ministerial departments, has developed the 'National Integrated Program for the Economic Empowerment of Women and Girls (PNIAEF) by 2030', also known as 'Maroc-Attamkine'. This initiative focuses on enhancing the institutional framework for women's economic empowerment, centering on three strategic areas: access to economic opportunities, education and training, and a supportive and sustainable environment that protects and advances women's economic rights.

Furthermore, the Ministry of Economic Inclusion, Small Business, Employment, and Skills, in partnership with Belgian cooperation, has launched the 'Min Ajliki' project. This project is dedicated to fostering employment opportunities for women and enhancing their economic empowerment. In 2020, it supported the establishment of 437 women-led businesses, nearly 500 in 2021, and aims to assist up to 600 women entrepreneurs by 2024.

Additionally, the Moroccan government, as part of its 2021–2026 governmental program, is committed to promoting gender-inclusive access to employment and entrepreneurship. This commitment is evident through various programs such as INTELAKA, FORSA, AWRACH, TAEHIL, and IDMAJ. Besides these overarching initiatives, there are several sector-specific actions designed to boost women's employment and access to entrepreneurial and income-generating activities in fields like agriculture, fisheries, industry, commerce, handicrafts, and the social and solidarity economy.

Source: Synthesis of the 2023 edition of the Gender Responsive Budgeting Report, Ministry of Economy and Finance, Kingdom of Morocco.

> **"Tunisia is a great market to test and learn, but what is missing is support to scale."**
>
> **Tunisia, Entrepreneur who has relocated to Europe**

54 Alaoui, Mehdi. N/A. Country Guide Morocco, Startup Universal.
55 IEA. 2022.Green Innoboost:How Governments Support Green Energy Start-Ups.
56 UN Population Division Data Portal. Accessed October 2023.
57 World Bank Gender Data. Accessed on October 2023.
58 Ministry of Industry and Commerce (MCINET), Government of Morocco. Renewable Energy website.
59 INSME. 2017. *The Innov Invest Fund in Morocco.*
60 IEA. 2022. *Green Innoboost, How Governments Support Green Energy Start-Ups*.

Morocco has established various institutions dedicated to supporting the country's renewable energy sector. One such organization is the Research Institute for Solar Energy and New Energies (IRESEN), which is committed to supporting the industry and fostering innovation. Through programs like GreenInboost, IRESEN has helped early-stage startups and innovators transition from laboratory research to launching a tested product in the market. With over US$50 million funding, IRESEN has supported more than 800 researchers and innovators.[61] In addition to IRESEN, the National Agency for Electricity and Potable Water (ONEE) operates the transmission grid, while the National Agency for Energy Efficiency (AMEE) implements energy efficiency projects such as BINAYATE (energy efficiency for buildings) with the goal of improving energy efficiency across various sectors by 20 percent by 2030. The Moroccan Agency for Sustainable Energy (MASEN) is another institution that focuses on developing renewable energy projects like solar, wind, and hydropower. MASEN aims to install a minimum capacity of 3,000 MW by 2020 and 6,000 MW by 2030 with the Noor Solar Project, financed in part by the World Bank.[62]

Furthermore, there are existing efforts to accelerate financing into the green economy, including renewable energy and energy efficiency-related companies. One of these is the project 'Morocco Green Fund', funded by Financial Sector Develop (FSD) Africa, which aims to conduct a scoping study for the development of a financing offer in support of the green economy in Morocco. The project seeks to address the green finance gap in Morocco through a comprehensive analysis and identification of suitable financial instruments to boost emerging green finance projects and SMEs in the country. The implementation period spans from 2022 to 2024, and the current progress involves conducting a feasibility analysis of green finance instruments for SMEs in Morocco. The project also aims to develop a new instrument to cater to the unmet demand for financing green SMEs.[63]

Overview of the Ecosystem in Tunisia

Tunisia's startup ecosystem has been making strides in recent years, with a focus on fostering a successful and inclusive environment for startups. The growth of Tunisia's startup ecosystem has been notably bolstered by governmental backing, particularly through the Startup Tunisia program. Spearheaded by the Ministry of Communication Technologies and Digital Transformation, this initiative was rolled out in 2019, after the passage of the Tunisia Startup Act a year earlier.

Since signing a startup bill into law in 2018, Tunisia has made considerable progress in fostering its startup ecosystem. Over 650 startups have been officially recognized, and initiatives such as the Flywheel program and the €100 million Fund of Funds program[64] have been launched. Startup Tunisia provides grants of up to TND 200,000 (US$63,000) to aid the establishment of new startup support programs. Air2, another program of Startup Tunisia, offers similar support to seed-stage companies, composed partly of grants and partly of reimbursable loans.[65] Thus far, only one energy efficiency-related startup appears to have benefited from the program Wattnow, founded and led by a male team.[66]

In 2022, Anava, a government-mandated fund of funds aimed at fostering a better investment framework for startups and innovative entrepreneurship, received a €20 million subscription from Kreditanstalt für Wiederaufbau (KfW) Development Bank, reaching a total of €60 million. Anava invested in prominent VC funds, including 216 Capital Fund I and Badia Impact Squared. Innovative Startups and SMEs, a multifaceted World Bank project[67] aimed at fostering innovation and entrepreneurship in the country, provided a US$75 million loan from the Anava fund, with US$17 million allocated to the Innovatech Fund. Furthermore, Tunisia's 2023–2025 Development Plan[68] includes €2.1 billion targeted at green projects.[69] Notable deals in the ecosystem include Appetito's acquisition of Lamma for US$12.5 million and Gomycode's US$8 million Series A funding round, both in June 2022.

61 Institut de Recherche en Energie Solaire et Energies Nouvelles (IRESEN) website: https://iresen.org/. Accessed October 2023.
62 World Bank. 2014. *Noor Solar Power Project. World Bank Operations Portal.*
63 FSD Africa. Morocco Green Fund website: https://fsdafrica.org/projects/morocco-green-fund/. Accessed October 2023.
64 Government of Tunisia. Tunisia Startup Act Fund of Funds Program website: https://www.startup-act.tn/index.php/en/startup_invest/the_fund_of_funds. Accessed October 2023.
65 Government of Tunisia. Air 2, Startup Tunisia website: https://startup.gov.tn/fr/startup_ecosystem/flywheel/air2. Accessed October 2023.
66 Wattnow.io website: https://wattnow.io/. Accessed October 2023.
67 World Bank. 2019. *Tunisia Innovative Startups and SMEs Project.*
68 Government of Tunisia. 2023. *Tunisia's 2023–2025 Development Plan*.
69 Startup Genome, Tunisia website: https://startupgenome.com/ecosystems/tunisia. Accessed October 2023.

Box 2: The FAST Program

The Tunisia *Femmes et Accélération pour les Start-ups et TPE* (FAST) program is a key initiative aimed at bolstering and structuring the entrepreneurial ecosystem in Tunisia. This program falls under the broader *Jeunesse, Entrepreneuriat et numérique en Tunisie* (JET) initiative. FAST is specifically designed to support the acceleration of startups and very small enterprises (TPEs), with a particular focus on women's entrepreneurship.

Key aspects of the FAST program are as follows:

- **Funding and implementation.** The program is financed by the French Development Agency (*Agence Francaise de Developpement,* AFD) and implemented by *Caisse des Dépôts et Consignations* (CDC), with technical assistance from Expertise France, part of the AFD Group.
- **Objectives.** FAST aims to reinforce and sustain the development of Tunisia's entrepreneurial ecosystem. It focuses on selecting and supporting entrepreneurial initiatives that align with the sector's needs and contribute to combating unemployment and other economic challenges.
- **Launch and reach.** The first call for projects under the FAST program was launched on October 12, 2021. This call was directed at programs that can assist in the development and structuring of Tunisia's entrepreneurship ecosystem.
- **Target audience.** While the program is inclusive, it places a special emphasis on initiatives that support women entrepreneurs, recognizing their crucial role in economic development and the unique challenges they face.

The Tunisia FAST program represents a significant effort to nurture and grow the entrepreneurial landscape in Tunisia, with a special focus on empowering women entrepreneurs and supporting small-scale business ventures.

Source: FAST | Femmes et Accélération pour les Start-ups et TPE and Premier appel à projet FAST - La France en Tunisie (Embassy of Republic of France).

The Opportunity

In MENA, entrepreneurship in renewable energy, energy efficiency, and related sectors presents a dual imperative of opportunity and necessity. Climate change is an immediate threat that demands swift action. The MENA region is particularly susceptible to its devastating effects, such as extreme temperatures and water scarcity. Transitioning to renewable energy is not a choice; it is an imperative. Egypt, Morocco, and Tunis are no exceptions and are well positioned to address this dual imperative.

In this context, attracting private investments and mobilizing women's entrepreneurial potential in green cleantech are crucial for a successful energy transition and reaching global climate goals.[70] According to the International Energy Agency (IEA), to reach the Paris Agreement target of limiting global temperature increases to below 1.5°C, renewable investments need to reach US$1.3 trillion annually by 2030. The IEA estimates investments in energy in 2023 to be around US$2.8 trillion, with more than US$1.7 trillion going to clean energy, including renewable power, nuclear, grids, storage, low-emission fuels, efficiency improvements, and end use renewables and electrification.[71] Moreover, the transition from conventional to renewable industries is expected to generate around 24 million jobs by 2030.[72] Yet, the growth of renewable energy in global electricity generation faces challenges due to insufficient public funds; therefore, mobilization of private investments is a necessary imperative.

70 World Bank. 2023. *Catalyzing Private Investments and Climate Finance to Turn Energy Transition Ambitions to Reality.*
71 IEA. 2023. *World Energy Investment 2023.*
72 Briter Bridges. 2022. *Adapt, Mitigate and Grow: Climate Tech in Africa.*

Specifically, the first opportunity, for entrepreneurs and investors, lies in the fertile ground presented by the sector for innovation. This is especially true in a region that experiences the adverse effects of climate change firsthand. With a high level of STEM education and graduates in all three countries, both in terms of numbers and technical capacity, opportunities exist to develop locally developed and tested solutions with potential for global applicability. Investing in entrepreneurs is not just a means to address regional challenges, it is also an opportunity to export potentially groundbreaking technologies to both developing and developed countries.

Women STEM graduates can contribute significantly to inventing and implementing critical solutions. The second opportunity lies in leveraging the potential of women STEM graduates by facilitating pathways for their participation in the labor force and boosting their increased access to economic opportunities. As such, the region and each individual country can significantly benefit from mobilizing the highest level of its human resource potential.

> **"Women prefer easier and quiet jobs and sectors... and not tough jobs such as waste management and energy. You need to be a "free" woman (without any traditional responsibilities) to be able to take this on."**
>
> **Egypt, Employment support organization executive.**

Considering the high level of women STEM graduates in the region, overlooking the brain power potential that women can bring would be a missed opportunity. However, the reality is that there is a gender gap in terms of transitioning from STEM to professional or entrepreneurial endeavors within the field. Instead, a discernible trend emerges where these women gravitate toward more secure and stable career trajectories. This divergence not only represents a missed opportunity for these women to fully harness and apply their specialized knowledge but also signifies a considerable loss for the societies that could benefit from their expertise and innovation.

Promoting gender equality in the entrepreneurial landscape necessitates the provision of female role models, coupled with targeted encouragement and support. The inclination of some qualified women to gravitate toward less challenging work environments underscores the disparity between high STEM graduation rates and active participation in the sector. By addressing this, not only can we harness the potential of these women, but we can also foster a more balanced entrepreneurial environment from a gender standpoint. Global programs such as Women Entrepreneurs Finance Initiative (We-Fi) (see Box 3) are trying to address some of these problems and are increasing their focus on climate tech.

> **"Within the energy sector, the Government is acting more like a competitor than regulator or facilitator."**
>
> **Egypt, Investor representative**

Renewable energy, energy efficiency, and related sectors and the region present unique challenges. Unlike the more popular startup sectors, such as e-commerce and fintech, renewable energy and related fields are more capital intensive and research driven. As such, renewable energy entrepreneurship often requires substantial capital and research investments.

The sector has the potential to both accelerate the implementation of existing solutions and innovate new ones, which demands both financial resources and specialized expertise. Existing technology startups offer software and hybrid solutions for energy efficiency management, solar panel distribution and installment, and resource management, such as waste to oil or biogas. Few startups focus on energy production and use of deep-tech solutions. While software-based solutions are also critical, their impact is often less transformative in the absence of hardware-based, technologically advanced solutions. Scaling the implementation of existing hardware solutions, such as installation of roof top solar panels through improved access to finance and new markets, is also critical.

Box 3: The Women Entrepreneurs Finance Initiative

The We-Fi program, implemented by the International Finance Corporation (IFC), is a global initiative designed to support women entrepreneurs in scaling their businesses. The program, with an allocation of US$69 million, aims to mobilize US$1.79 billion and reach 87,920 women entrepreneurs, catalyzing US$16 billion in financing to women-owned small and medium enterprises (WSMEs). The program's timeline is from 2018 to 2033 and covers 35 countries.

Key components of the We-Fi program are as follows:

1. **Expanding financial services.** This involves supporting banks, fintechs, and insurance companies with blended finance investments to reach more WSMEs. It also includes providing advisory services to design and deploy products and services tailored for women entrepreneurs.
2. **Improving market access.** The program focuses on integrating WSMEs into domestic and international value chains and producer networks, thereby increasing procurement opportunities for WSMEs.
3. **Strengthening entrepreneurial ecosystems.** This includes championing gender-lens investing through funds, incubators, and accelerators and providing direct investments in high-potential women entrepreneurs.

The We-Fi program by IFC is a comprehensive approach to address the challenges faced by women entrepreneurs, particularly in accessing finance and markets, and to empower them to expand their businesses into new markets. The initiative underscores the importance of creating an enabling environment for women entrepreneurs, fostering their growth, and contributing to the broader goal of gender equality in the business world.

Source: We-Fi (last accessed December 10, 2023).

The sector is also frequently controlled by large corporations or state entities, making it challenging for smaller players to break through. These create significant barriers to entry that can be daunting for startups, as voiced by the participants in the interviews for this study.

For women entrepreneurs, the challenges also vary between urban and rural settings. Urban areas offer better infrastructure, providing more opportunities for growth, fundraising, and increased competition, which pushes companies to be more productive. In contrast, rural areas, particularly for women entrepreneurs, present unique challenges, such as limited access to resources and higher socioeconomic barriers.

Cumulatively, from both entrepreneurs' and investors' perspectives, the sector appears riskier compared to other fields. A High-level of up-front investment requirements, uncertainties around R&D, and barriers to entry mean longer and less certain payback terms. Added to this is the overall lack of exit opportunities, from which startups in these fields may also suffer disproportionately for the same reasons cited above.

> "It's a rare thing to find solo female founders - very rare, haven't had any pitches from so far. Of more than 100 companies that I've spoken with, only 2–3 had women co-founders. There is also under representation on the investor side."
>
> **Venture Capitalist, Egypt**

Data show that companies that received funding are mostly in e-commerce, fintech, and software sectors. In all three countries, cleantech and renewable energy-related startups lag far behind other sectors, for reasons explained in the next chapter.[73] The likelihood of raising funds more easily in other sectors also encourages more founders to choose those paths.

73 Briter Intelligence, last accessed September 2023.

III. Innovative Financing Structures for Women-Led Climate Tech Companies

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All three countries offer vibrant ecosystems with active investors, yet the number and size of investments fall short of the demand. The interviews indicated that, while there are investments in all three countries, the number of investors and the amount of investment are not sufficient. This observation is not limited to renewable energy-related projects or women entrepreneurs, but for the overall ecosystem in the countries. Furthermore, most of the investments are made in more mainstream startup sectors such as e-commerce. Almost all the investments are made in startups that offer potential to scale quickly.

The interviews indicate that alternative investment structures are desired by entrepreneurs and may address some of the concerns of the investors. During the interviews, several key points emerged regarding the startup investment landscape. The availability and proliferation of diverse types of capital, including equity, debt, and grants, were highlighted as necessary for startup growth.

However, there is also a specific need for patient and non-dilutive capital, and revenue-based financing was identified as a favorable option. Startups, both male and female led, often start in their own country, proving their business model before seeking investment and growth opportunities in other markets. Saudi Arabia was mentioned as a country with more available funds and a streamlined investment process. While some startups have the resources and network to seek investment abroad, others prefer grants from support programs or awards from pitch competitions. Interviewees from all three countries noted that angel investors could play a more active role in mentorship and provision of support, such as through introductions and business coaching.

Box 4: Digital for Women

The 'Using Digital Solutions to Address Barriers to Female Entrepreneurship' program, developed by the World Bank Group, is a comprehensive toolkit designed to advance women's entrepreneurship. This initiative recognizes the transformative impact digitalization can have for business owners, particularly women, by helping them operate more effectively. The program aims to increase women's knowledge of legal and regulatory provisions, facilitate access to finance and credit tools, and provide training, skills, and information to help them expand into new markets.

Key aspects of the program are as follows:

1. **Focus on digital solutions.** The program emphasizes the use of digital solutions to ease constraints faced by female entrepreneurs, acknowledging the specific obstacles they encounter.
2. **Toolkit for practical guidance.** The toolkit offers practical guidance for analyzing, designing, and measuring technology-enabled solutions to advance women's entrepreneurship. It includes detailed instructions and resources to help implementers use thorough diagnostic processes to identify key constraints, including barriers to technology access and use.
3. **Intervention recommendations.** The toolkit provides recommendations for interventions that incorporate digital technology, illustrated by project examples.
4. **Monitoring and evaluation.** It includes a menu of indicators and advice for monitoring project results, ensuring the effectiveness of the interventions.
5. **Target audience.** While primarily designed for World Bank Group project teams, the toolkit is also useful for governments, donor agencies, nongovernmental organizations (NGOs), and private sector stakeholders.
6. **Components.** The toolkit covers conceptual background and context, diagnostic methods, design processes, technology criteria, case studies, and monitoring and evaluation guidelines.

This program aims to empower women entrepreneurs by leveraging digital technology, aiming to create a more inclusive and successful business environment for women globally.

Source: Digital for Women, World Bank Group.

The role of collateral in lending decisions, which has an adverse impact on women's access to finance, may also have significant impact for women entrepreneurs. Although microloans have increased access to finance for women-led microbusinesses, women-led businesses suffer from requirements of traditional lenders such as banks, which often require collateral. Alternative forms of risk assessment, cash flow-based lending such as revenue-based financing, or receivables discounting may be considered to mitigate these problems.[74]

74 Ubfal, Diego Javier. 2023. *What Works in Supporting Women-Led Businesses?* Washington, DC: World Bank. http://hdl.handle.net/10986/38564

Fostering fintech solutions that offer digital products appears to improve women's access to finance, overcoming barriers of obtaining financing from traditional sources. A study by World Bank's Digital for Women[75] (see Box 4) finds that digital financial services have the potential to narrow the gender disparity in both account ownership and credit accessibility. By reducing the costs associated with accessing financial services and circumventing limitations set by societal norms and restricted mobility, these services offer a viable solution. Furthermore, digital financial services play a crucial role in enhancing women's empowerment and independence, as they allow for greater management and control over their financial assets. Evidence from the Global Findex indicates that the adoption of digital financial services, such as mobile money, has significantly boosted women's engagement with financial services in numerous economies in recent times.

Valuations for startups were noted as lacking a common ground, with benchmarks often insufficient and the valuation range varying widely. Startups expressed challenges in approaching investors and deciding how much and what to present and disclose and were weak in negotiations. Exits by investors are limited and pose significant uncertainties affecting investment decisions. The need for a broader and deeper secondary market was emphasized to create alternative exit options, for investors, founders, and employees holding share options.

> **"Revenue-based lending would be great in Morocco."**
>
> **- Morocco, Entrepreneur**

Challenges faced by entrepreneurs in the three countries are shared by entrepreneurs in other countries, and lessons learned on alternative financing structures may offer solutions. While each country context is unique, some of the challenges faced by entrepreneurs are common across other emerging market economies. Similarly, some of the reasons why investors shy away from investing in startups in these countries are also shared by investors in other countries. Alternative financing structures, such as revenue-based financing, impact-linked financing (ILF),[76] sustainability bonds, that have been deployed in other regions with demonstrated gender outcomes, and others, may offer solutions to some of the shared issues.

While these structures have been used in other countries, they should be explored in detail for each country's context, particularly from legal and tax perspectives. Although these structures in theory appear as potential solution providers, their applicability and impact in each country vary on the local legal landscape. Further analysis of these structures within each country would confirm their applicability and suggest how their potential can be unlocked.

One of the most prominent barriers to investment in the three countries studied, as well as many emerging markets, is the lack of exit opportunities for angel investors and VC funds. The VC model that predominates the world is based on the 'Silicon Valley' model. This model assumes functioning public markets as the first choice of exit for investors. This assumption unfortunately does not hold true in many countries, at least for startups, including in the three countries studied in this report. The second assumption is the existence of a wide range of investors, including strategic investors, investing at all stages of entrepreneurship. The third is a robust and attractive macroeconomic environment that attracts strategic investors.

Interviews confirmed that alternative 'impact investing structures' could solve some of the concerns of both entrepreneurs and investors, but a more detailed demand and impact potential analysis is needed. Interviews with different types of stakeholders confirmed that solutions such as 'revenue-based financing' and ILF could receive immediate demand from entrepreneurs.

75 World Bank Group. 2023. *Using Digital Solutions to Address Barriers to Female Entrepreneurship.*

76 Global Impact Investing Network. 2020. *Innovative Finance for Gender Equality: Impact-Linked Finance for Gender-Inclusive Fintech.* ILF is a financial structure where the terms of financing, such as interest rates or repayment schedules, are directly linked to the achievement of specific social or environmental impact outcomes. In essence, borrowers benefit from more favorable terms when they demonstrate measurable positive impact in predefined areas. Similarly, certain pre-agreement impact outcomes can be rewarded with cash to incentivize focus and resources for their achievement. While the concept has been applied in contexts like 'gender-inclusive fintech', where financial incentives are provided based on gender-focused outcomes, ILF can be tailored to various sectors and impact goals, offering a flexible tool to align financial returns with societal benefits.

Nevertheless, to ensure the feasibility of setting up and deploying these instruments through local fund structures, a more detailed study at the regional or nation level would be useful to confirm the full scale of demand, the quality, quantity, and suitability of the demand, and the impact potential that it would have by incentivizing funds.

One of the remedies to the lack of exits is alternative investment structures that are used by impact investors. This was confirmed by ESOs in all three countries. An example of such a structure is revenue-based financing where the exit from the investment is built into the structure, reducing uncertainties and betting on a future exit event, be it going public or being acquired by another fund or strategic investors.

Blended finance and impact-linked structures can reduce the risk of investors and supplement their returns to provide incentives for investments in targeted areas and entrepreneurs. In instances where risk and return levels of renewable energy-related early-stage investments do not meet investor expectations, innovative impact finance structures such as social impact incentives (SIINCs) or ILF approaches can be used to adjust risk and return levels to attract additional investments in a targeted way.

IV. Case Studies of Innovative Financing Approaches

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The chapter presents case studies and good practices in innovative financing mechanisms from around the world which demonstrate ways in which some of the areas of consideration identified in the note have been addressed using innovative structures. In particular, the cases are on revenue-based lending and financing, as a means to mitigate exit risks for investors and offer non-dilutive, collateral-free funding opportunities for growth of business which may have low prospects for a VC investor and lack opportunity to access bank financing. The second case presents ILF, a structure used to incentivize existing investors and businesses toward outcomes that are prioritized by governments or donors, through rewarding of outcomes and supporting their achievement with technical assistance support. The third case study, on Green Outcomes Fund (GOF), similar to ILF, is an outcomes-based instrument that blends concessional capital with commercial revenues of companies to increase their attractiveness to investors and push them to build green outcomes into their business models. The fourth case study is a Gender Bond, which provides wholesale capital with built-in gender criteria.

Case Study on Revenue-Based Lending and Financing

Empowering Women Entrepreneurs in Latin America through Revenue-Based Lending

Background. In Mexico, women entrepreneurs are a driving force in the economy, leading three out of every five SMEs. However, they face significant barriers in accessing traditional credit, representing only 16 percent of the formal business sector. This disparity is exacerbated by stringent collateral requirements and unfavorable interest rates, making it challenging for women-led SMEs (WSMEs) to secure the necessary financing to grow their businesses. On the flip side, absence of clear exit opportunities makes investing in these companies unattractive for equity investors.

The challenge of traditional financing. Traditional financing models often sideline WSMEs due to the nature and size of their businesses. The credit gap in Latin America stands at a staggering US$5,000 million for women's microenterprises and US$93,000 million for WSMEs. These figures underscore the pressing need for innovative financing solutions tailored to the unique challenges faced by women entrepreneurs.

Introducing revenue-based lending. Viwala, in collaboration with Pro Mujer and New Ventures, introduced a revenue-based lending option as a solution to the financing challenges faced by W SMEs. Unlike traditional loans, revenue-based lending offers flexible repayment options tied to the company's monthly revenues. This means that during months with higher revenues, businesses repay more, and during leaner months, they repay less. This model provides businesses with the financial breathing room they need, especially during uncertain economic times, and removes the risk of default due to fixed payment terms.

Benefits of revenue-based lending are as follows:

- **Flexibility:** Adjusts to the flow of business revenues, ensuring that repayments are manageable.
- **No heavy collaterals:** Reduces the need for collateral as typically required for bank loans, which is often a barrier for WSMEs. Women tend to be more risk averse or lack ownership of collateral.
- **Tailored for impact SMEs:** Designed specifically for businesses that have a social impact, especially those promoting gender equality, creating a funding opportunity only for a targeted segment of businesses.

Impact and future prospects. By leveraging revenue-based lending, Viwala, in alliance with Pro Mujer and New Ventures, offers a tailored financial solution that addresses the unique challenges faced by women entrepreneurs. This innovative approach not only bridges the financing gap but also fosters economic growth and promotes gender equality in Latin America.

Source: Promujer (https://promujer.org). Accessed October 2023.

Case Study on ILF

Catalyzing Women's Financial Inclusion with ILF

Background. Despite the transformative potential of female financial inclusion, women remain most of the world's financially excluded population. In emerging markets, inclusive fintech solutions present a significant opportunity to bridge this gap, offering cost-effective and convenient financial services access to women. However, the private sector's investments in fintech often overlook this potential.

Introducing ILF for gender-inclusive fintech. The Impact-Linked Fund for Gender Inclusive Fintech (ILF for GIF), designed, structured, and supported by Roots of Impact, offers a solution by providing ILF and technical assistance to fintechs, emphasizing gender-transformative outcomes. This approach aligns financial incentives with positive social outcomes, rewarding fintechs for achieving tangible impacts. In March 2022, the fund secured commitments of US$13.4 million, with a target fund size of US$21 million, from notable agencies like the Swiss Agency for Development and Cooperation (SDC) and the Austrian Development Agency.

Benefits of ILF are as follows:

- **Alignment with outcomes:** Fintechs are directly rewarded for achieving social impact, improving their profitability.
- **Catalyzing private investment:** For every dollar of impact-linked capital provided, the fund catalyzes additional private sector investments through renowned impact-oriented investment manager partners.
- **Supporting ecosystem enablers:** The ILF for GIF features accelerator and incubation programs, such as the Financial Solutions for Migrants Accelerator by Village Capital and the Financial Innovations for Women Affected by Migration (FIWAM) Growth Program by Seedstars.

Applicability of ILF in women's entrepreneurship in climate tech. The ILF for GIF initiative exemplifies a strategic approach to financing that prioritizes gender inclusivity in fintech. A similar fund can be designed to incentivize existing early-stage capital to women-led entrepreneurs. Similarly, existing companies can be incentivized to deliver on gender outcomes, such as equal employment and gender-focused products, by rewarding them for these outcomes.

Source: Impact Linked Finance Fund (https://ilf-fund.org) and Roots of Impact (https://www.roots-of-impact.org). Accessed October 2023.

Case Study on Outcomes Funds

The GOF from South Africa

The GOF was established by the National Treasury of the Republic of South Africa's Jobs Fund with support from the RMB Fund, part of the FirstRand Foundation. The GOF is designed to support investments in green micro, small, and medium enterprises (MSMEs) in South Africa. The GOF's approach bridges the financing gap for green MSMEs.

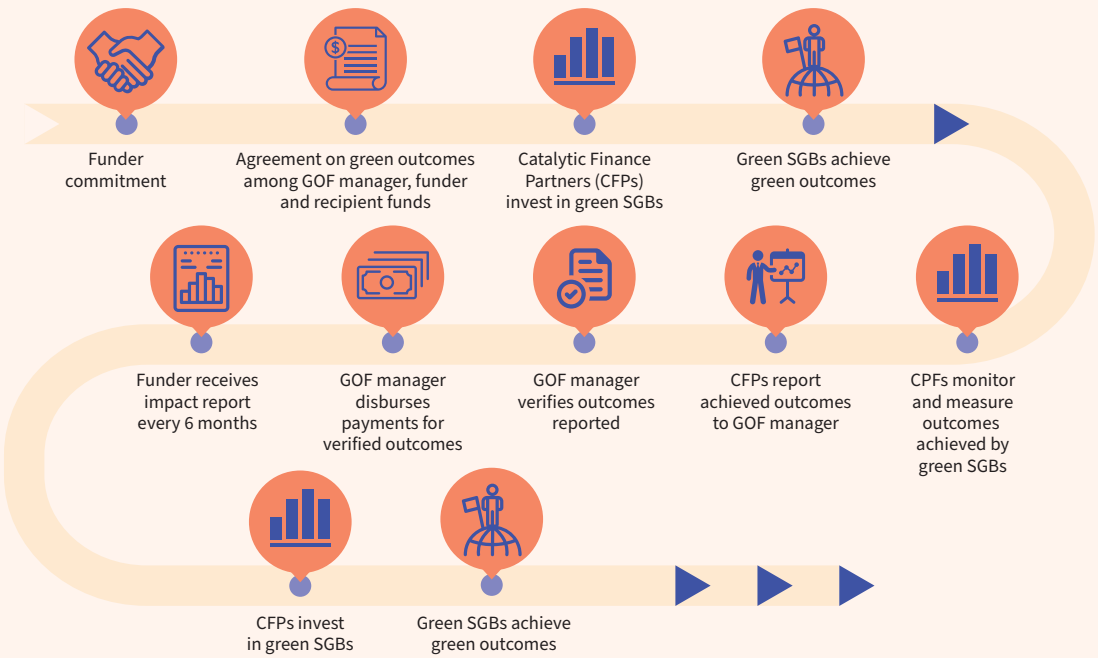
Innovation. The GOF blends concessionary funding with private capital, allowing local fund managers to adapt their MSME investment models. This approach incentivizes investments into companies which deliver green outcomes such as waste recycling, energy efficiency, and job creation. The GOF's payment system is outcome based. Grant payments are made based on green outcomes achieved according to predefined criteria to provide additional revenue streams or cost savings for MSMEs, thereby indirectly increasing the returns of the investors.

How does it work? The GOF provides incentives for local fund managers to invest in high-impact MSMEs by offsetting some of the associated risks and costs. For example, 'Grow', a green MSME, received a reduced interest rate debt deal from a local fund manager partnered with the GOF, thereby improving its revenues and attractiveness for investors.

Impact. 'Grow' used the funding to expand operations and hire eight more employees. The green jobs created led to outcome payments to the fund manager.

Applicability to women-led climate tech companies. The structure allows to incentivize verifiable outcomes. Gender-related outcomes and targeted criteria for eligibility, that is, that applicants must be women-led firms, can attract investments to women-led entrepreneurs in climate tech.

Figure 3: GOF Process



Source: GOF (https://thegreenoutcomesfund.co.za/).

Case Study on Gender Bonds

IFC and Itaú's Gender Bond for Womens Entrepreneurship in Brazil

Background. In February 2023, IFC subscribed to a US$200 million gender bond with Itaú Unibanco. This initiative was designed to bolster Itaú's lending program to WSMEs in Brazil, particularly focusing on businesses in the underserved regions of the north and northeast. This gender bond marked a significant milestone as the first of its kind issued by a private bank in Brazil.

Key highlights are as follows:

- The gender bond was issued in the form of '*letras financeiras* (LFs)' (financial letters), a unique debt security instrument for local financial institutions.
- IFC played a pivotal role as an anchor investor, mobilizing other investors to participate in the issuance, potentially raising up to an additional US$200 million.
- Data from the World Bank's Global Findex database and the World Economic Forum highlighted a disparity in access to finance. While 46 percent of male-owned businesses in Brazil could secure loans for business operations, only 29 percent of women-owned businesses had the same access.
- A significant portion of IFC's investment is earmarked to enhance financial access for women in the north and northeast regions of Brazil, aiming to stimulate economic and employment opportunities.
- Gender bonds, like this one, are dedicated to promoting gender equality, with funds exclusively allocated to support women entrepreneurs and their enterprises.
- This initiative builds on IFC's longstanding partnership with Itaú, emphasizing the importance of women's financial and economic empowerment for inclusive and sustainable growth.

Impact and future prospects. The bond issuance underscores Itaú's commitment to addressing social issues and resonates with the growing investor interest in socially responsible debt securities. This project is the largest of its kind in the Brazilian capital market with a gender focus. Furthermore, the collaboration between IFC and Itaú celebrates the 10-year anniversary of '*Itaú Mulher Empreendedora*', a program designed to empower women entrepreneurs. Since its inception, over 350,000 women have benefited from the program's training, workshops, and acceleration initiatives.

Conclusion. The gender bond initiative between IFC and Itaú Unibanco exemplifies a strategic approach to address gender disparities in access to finance. By leveraging innovative financial instruments, such collaborations can pave the way for more inclusive economic growth and set a precedent for simi for similar initiatives in the future.

Source: IFC press release, February 2023: (https://pressroom.ifc.org/all/pages/PressDetail.aspx?ID=27399). Accessed October 2023.

V. Conclusion

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This note, based on interviews with stakeholders and ecosystem actors in Egypt, Morocco, and Tunisia, delved into the landscape of women's entrepreneurship in climate tech. It aimed to provide a comprehensive analysis of the ecosystem, emphasizing barriers that impede women's full participation in entrepreneurship in renewable energy and climate-related areas. To this, the study took a macro approach to look at women's entrepreneurship and how it intersects with entrepreneurship in climate tech. The study's approach is thematic, drawing from the unique backgrounds of the three countries without direct comparison. It offers insights into each country's entrepreneurial landscape, focusing on renewable energy, and highlights shared issues.

Further studies that compare the status of women entrepreneurship and investments in other fast-developing sectors such as telecommunication and e-commerce may be useful to learn lessons. Telecommunication carries in many ways similar aspects to some climate tech as a regulated, R&D-heavy sector that requires engineering skills and often asset-heavy investments. The role of women entrepreneurship in this as well as less similar sectors, such as e-commerce, which is significantly less regulated, asset light, and less technical, could provide insightful comparison and lessons that could be drawn. Furthermore, identifying and highlighting successful women in these sectors would be a general boost for women exploring entrepreneurship as a path.

Key Considerations

While detailed suggestions categorized by generic, gender, and climate tech considerations are presented in Annex I, below is a summary of the key findings and considerations (combining generic and specific) that together take a holistic approach to supporting women's entrepreneurial journey identified under the specified objectives:

A. Creating an enabling environment through multistakeholder engagement and private-public partnerships:

- **Low levels of women's entrepreneurship, including in climate tech, stem from a multitude of reasons, including complexities inherent to the climate sector, risks associated with early-stage investments, limited availability of financing, absence of tailored support structures for women, and societal norms.** The interviews and desktop analysis confirmed that there is no easy quick solution, yet many improvements can be made to increase women's entrepreneurship in climate tech. A coordinated and holistic approach is required to facilitate women's involvement, which calls for actions from policy makers, support organizations, educational institutions, investors, and women. Specifically, findings from the study reveal the following opportunities to boost entrepreneurship support for women innovating in the subject matter sectors.

- **The renewable energy sector poses distinct challenges for women entrepreneurs, necessitating a combined effort from both the private sector and government to fully tap into the potential of female entrepreneurs, especially among STEM graduates.** Each of the three countries studied boasts a high number of women STEM graduates. However, the inherent risks of the sector, as elaborated below, can be daunting for both entrepreneurs and investors. Unlike other industries, such as e-commerce or software development, the challenges here are multifaceted, making it difficult for start-ups to enter the sector, innovate, and attract investments. A comprehensive approach that looks at the entire journey of an entrepreneur, from education to ideation, from starting a business to raising capital, from growing a business to exits for investors, is needed. [77]

- **A supportive environment that nourishes entrepreneurship addressing both formal and informal factors is critical.** Interviews underlined the importance of a supportive system that comprises both informal and formal structures. The need for refining formal structures, such as policy frameworks that encourage female participation in the sector and market structures that are receptive to their ventures, was highlighted. Equally crucial are the informal norms. Societal and familial expectations, as well as perceptions held by women themselves, investors, and support organizations, play a significant role in shaping entrepreneurial aspirations. By aligning both formal and informal elements, we can create a conducive environment that is receptive to female-led entrepreneurial initiatives.

B. Designing tailored support and capacity building that respond to women's specific and regional needs as entrepreneurs:

- **Amid societal pressures emphasizing traditional roles, tailored support structures and programs that merge flexibility, accessibility, and childcare can pave the way for women's entrepreneurial pursuits in the region.** The societal expectations for women to prioritize their roles as wives and mothers often conflict with the perceived risks of entrepreneurship. Many women, influenced by their families, seek stable, reputable jobs over the uncertainties of startup ventures. To encourage women's participation in entrepreneurship, support programs should recognize and accommodate these dual responsibilities. This can be achieved by offering flexible working hours, convenient locations, easy transportation options, and childcare facilities. Such accommodations can make entrepreneurial roles more accessible and appealing to women in the region.

77 An 'exit' in the context of early-stage investment refers to the method by which investors realize a return on their capital. Common exit strategies include trade sales, IPOs, mergers or acquisitions, secondary sales, buybacks, or, less desirably, liquidation. These strategies are crucial for investors to convert their investments into cash. Successful exits not only provide financial returns but also reinforce the cyclical nature of investment, fostering continued innovation and entrepreneurship.

- **Support programs for women entrepreneurs are available but require further tailoring to address specific needs.** Customized learning paths, mentorships, enhanced access to networks, education on mental health, and training in public speaking are essential components of this tailored approach. Moreover, it is crucial to recognize the stark differences in opportunities between major cities and rural areas, ensuring that such supports are not only effective but also widely accessible across diverse geographies.

C. Customizing investment pathways that are context appropriate and build a culture of women as leaders:

- **Existing investment models in the three countries, as is the case in most of the world, are based on the Silicon Valley VC and angel investment models, which often overlook businesses without 'unicorn'[78] potential, necessitating alternative investment structures that align with local realities.** The prevailing VC and angel investment approaches are significantly influenced by the Silicon Valley experience, a framework that often proves ill-suited when applied beyond its original context, especially outside the US. Several factors contribute to its limited applicability in the three countries studies. First, the model presupposes a dense network of investors, each operating at different stages, thereby facilitating a continuous cycle of exit and further fundraising opportunities. Additionally, it assumes the presence of a robust stock market, which is essential for startups and VCs to exit. This approach is primarily concentrated on identifying businesses with exponential scalability, often sidelining enterprises that, while not potential 'unicorns', hold significant promise in terms of solution generation, job creation, and wealth building.

- **Having a higher number of women and in more senior positions in the investment sector is also critical to promote women's entrepreneurship.** The interviews indicated that, while the presence of women in the ESOs is prevalent, women's presence in the investment scene, such as in leadership positions, is far behind that of men. The interviews also voiced biases by male fund managers toward male entrepreneurs. An IFC study finds that private equity and VC funds with gender-balanced senior investment teams generated 10 to 20 percent higher returns compared with funds that have a majority of male or female leaders.[79]

- **Promoting women's entrepreneurship extends beyond solely championing women founders.** By immersing women in startup culture and fostering opportunities for them as technical staff and senior leaders within startups, it is important to cultivate an environment where they can firsthand witness the entrepreneurial landscape, recognize opportunities, and envision their potential to innovate. Embarking on the entrepreneurial journey often begins with experiential learning and on the job training. Serving as an employee in a startup provides a nurturing foundation, a sentiment echoed by the trajectories of numerous successful startup founders globally.

D. Boosting recognition of women as role models and fostering a pipeline of young innovators in climate tech:

Women role models pave the way for new success stories by younger generations and accelerate the achievement of gender equality. The presence of women role models in entrepreneurship has been empirically linked to the aspirations and achievements of younger generations.[80] Witnessing successful female entrepreneurs can directly influence the entrepreneurial intentions and self-efficacy of other women. This ripple effect not only fosters a new wave of female-led success stories but also expedites the journey toward achieving gender equality in the entrepreneurial landscape. Thus, promoting and highlighting women role models in entrepreneurship becomes a pivotal strategy for encouraging more women to consider this career path.

78 A 'unicorn' in the realm of early-stage investments refers to a privately held startup company that achieves a valuation of US$1 billion or more. The term was coined by venture capitalist Aileen Lee in 2013, drawing on the rarity of such successful ventures. Unicorns are often seen as a benchmark for startup success, representing both significant growth potential and validation of the company's business model in the eyes of investors.
79 IFC. 2019. *Moving Toward Gender Balance in Private Equity and Venture Capital.*
80 Karimi et al. 2013.

Annex I: Matrix of Considerations to Promote Women's Entrepreneurship in Climate Tech

Fostering entrepreneurship involves a holistic approach that encompasses the entire entrepreneurial journey. An entrepreneur's journey, from ideation and launching a business to attracting seed capital, developing a product, scaling market penetration, and raising new funds, requires distinct types of support. For this journey to be successful, it is essential to build entrepreneurship into education programs, have appropriate support organizations and financial structures, and provide continuous skills development tailored for women in the targeted sectors. The note aims to provide areas of consideration for policy makers, investors, and ESOs to address the needs across the entire journey.

Below are detailed considerations across generic and specific areas of considerations, including gender and climate tech, by different actor roles (policy makers, investors, and ESOs):

Considerations	Policy Makers	Investors	ESOs
Generic	Blended finance, ILF, and outcomes-based investment structures may be considered, as innovative approaches, to promote commercial investors to invest in early-stage R&D focused on asset-heavy companies.	Alternative investment structures, such as revenue-based financing, with built-in exits, may accelerate funding into cash generating early-stage companies.	ESOs may play a critical role in building the capacity of policy makers and philanthropic organizations to promote alternative investment and funding structures such as revenue-based financing, forgivable loans, and outcomes-based funding.
	Policy makers may consider internal and external capacity building to further diversify funding mechanisms used for early-stage companies, to promote the use of innovative grant making models by philanthropic organizations (such as forgivable loans).	The potential offered by STEM graduate women in all three countries may be overlooked, resulting in missed opportunities that are both commercially attractive and critical to meet climate goals.	ESOs may be well positioned to develop policy notes on innovative financing, development of secondary markets, and other structural changes that may promote more investment into early-stage companies.
	The startup ecosystems in all three countries are vibrant. Policy makers could consider the promotion of secondary private markets to increase liquidity and attract more investors.	Investors may consider supporting the development of a secondary market to ease partial exits and encourage the wider use and exercisability of employee share options to attract talent to the ecosystem.	ESOs could showcase working examples from other countries to raise awareness among investors and policy makers on alternatives to equity financing that relies on exponential growth and traditional exit mechanisms.
	Alternative working capital mechanisms could be explored to offer access to non-dilutive growth capital options for cash-generating businesses that are not able to or willing to use debt from banks.	Investors may consider setting up debt funds that use alternative structures to offer working capital financing options to early-stage companies that are not eligible for or unwilling to use bank financing.	
	More detailed studies could be undertaken to ensure the feasibility of setting up and deploying these instruments through local fund structures. A more detailed study at the regional or nation level would be useful to confirm the full scale of demand, the quality, quantity, and suitability of the demand, and the impact potential that it would have by incentivizing funds.	Investors may consider working more closely with policy makers to voice their concerns to increase the number and size of their investments in early-stage companies and what it would take for them to address the funding needs of overlooked companies.	Companies without exponential growth opportunities but with the potential to grow, increase local employment, and generate role models can be considered.
	Entrepreneurship is a journey that starts with early education and continues to ideation, starting a business, growing it, fundraising from it, and often exiting. Policy makers may consider and evaluate support programs at each of these stages, targeted at all those that are critical to ensuring success, including families, education institutions, ESOs, policy makers investors, non-VC financial institutions, and entrepreneurs.	Investors may consider the viability and potential of alternative fund structures that focus on companies without exponential growth prospects but with stable growth and cash generation opportunities.	

Considerations	Policy Makers	Investors	ESOs
Gender specific	Amid societal pressures, emphasizing traditional roles, tailored support structures and programs that merge flexibility, accessibility, and childcare may pave the way for women's entrepreneurial pursuits in the region. Their wider use and effectiveness may be considered.	Having a higher number of women and in more senior positions in the investment sector may be considered to promote women's entrepreneurship. The interviews indicated that, while the presence of women in the ESOs is prevalent, women's presence in the investment scene, such as in leadership positions, is far behind that of men. An IFC study finds that private equity and VC funds with gender-balanced senior investment teams generated 10 to 20 percent higher returns compared with funds that have a majority of male or female leaders.	ESOs can consider developing tailored programs for women, recognizing their dual responsibilities as mothers. This may be achieved by offering flexible hours, convenient locations, easy transportation options, and childcare facilities. Such accommodations may make entrepreneurial roles more accessible and appealing to women in the region.
	Detailed assessment of existing business registration regulations and their impact on women entrepreneurs may be useful to identify possible areas of improvement, such as location of services, availability hours, and requirements that may hinder women from registering their businesses.	Interviewers indicated that networking and nonfinancial support provided by investors, such as mentoring and introduction to business partners, may significantly contribute to growth of women-led businesses, who may be less forthcoming for this type of support compared to male entrepreneurs.	Increased and tailored networking opportunities, with role models, potential business partners, investors, and fellow entrepreneurs may encourage more participation by women and support the growth of those how have started their entrepreneurial journey.
	Women entrepreneurs face numerous barriers, such as limited access to financial resources, lack of business education, and restrictive cultural norms, which hinder the transition from startup intention to actual business creation. Policy makers may evaluate which areas in particular may be addressed to create a more supportive environment that mitigates the particular challenges that are gender based.	Investors may consider evaluating their portfolios to identify their gender performance using industry standard metrics such as the 2X challenge and explore playing active role to promote women's roles in their investee companies. Involvement of women as employees in startups may promote increase in the number of successful women entrepreneurs.	Immersing women in startup culture and fostering opportunities for them as technical staff and senior leaders within startups cultivate an environment where they can firsthand witness the entrepreneurial landscape, recognize opportunities, and envision their potential to innovate. Serving as an employee in a startup provides a nurturing foundation, a sentiment echoed by the trajectories of numerous successful startup founders globally. ESOs may consider cultivating a culture of women's employment in their startup communities, supporting not only women entrepreneur candidates but also those who wish to start the journey through employment.
	Egypt, Morocco, and Tunisia have significant renewable energy potential and a high ratio of women graduating from fields of study. They possess significant opportunities to create multiple layers of impact by pushing forward women's participation in entrepreneurship. These layers of impact may include climate and economic impact through a faster transition to renewable energy, social impact through women's empowerment in business and society, and economic development through increased entrepreneurial activities and employment.		
	Government funding for entrepreneurship support programs can be designed to promote specific impact and outcomes, through the use of innovative structures such as ILF and outcomes-based contracts.	Studies demonstrate that companies founded by women and those that have diverse management teams are likely to be more successful than companies founded only by men and led by heterogenous management teams. Investors may explore refining their investment criteria to be more proactive in scouting women entrepreneurs or companies with diverse leadership.	Witnessing successful female entrepreneurs can directly influence the entrepreneurial intentions and self-efficacy of other women. This ripple effect not only fosters a new wave of female-led success stories but also expedites the journey toward achieving gender equality in the entrepreneurial landscape. ESOs may consider further emphasizing successful role models, with diverse backgrounds, with whom aspiring women entrepreneurs can identify themselves.

Considerations	Policy Makers	Investors	ESOs
	Success of women's entrepreneurship depends on increasing societal support and reducing societal barriers. As such, policy makers may evaluate focusing not just on women but the broader environment, including cultural norms of public service providers, financial institutions, and education programs, and broaden their focus from building the capacity of women to shifting the mindset of other actors who may have a positive or negative influence.		Promoting gender equality in the entrepreneurial landscape necessitates the provision of female role models, coupled with targeted encouragement and support. The inclination of some qualified women to gravitate toward less challenging work environments underscores the disparity between high STEM graduation rates and active participation in the sector. By addressing this, not only can we harness the potential of these women, but we can also foster a more balanced entrepreneurial environment from a gender standpoint.
	It is estimated that transition to renewable energy will generate over 11 million additional energy sector jobs by 2050. Policy makers may consider how to leverage this opportunity to promote gender-sensitive employment, leadership, and entrepreneurship.		Further differentiating of content and availability of programs that are offered in urban settings compared to rural settings may be considered.
Climate tech specific	Policy makers may consider the level of funding provided for entrepreneurial programs and consider whether innovative structures may incentivize climate outcomes. This may be for both adaptation and mitigation-related companies.	Investors may explore with development finance institutions (DFIs) and other funding providers to develop new investment thesis that prioritize climate tech companies.	Entrepreneurship support programs are often focused on highly scalable programs that may be attractive for VC investments. Yet adaptation and mitigation of climate crisis-related impacts may also benefit from proliferation of small businesses. ESOs may consider whether and what type of support can be provided for such businesses.
	Climate tech companies that offer novel solutions may require longer R&D periods and up-front capital expenditures, which may reduce their attractiveness for investors. Policy makers may consider special provisions to support such companies to increase their attractiveness for investors.	Although not directly linked to climate tech entrepreneurship, investors may evaluate their portfolios and use methodologies such as life-cycle assessment to understand the negative and positive climate impact of their companies and take measures in their portfolio management approaches to promote climate positive outcomes.	ESOs may consider designing programs that bring together large companies with climate-related concerns together with entrepreneurs to create nonfinancial support opportunities, such as join R&D, proof of concept design, and minimum viable product development. Interviews highlighted the importance of such nonfinancial support that can facilitated by ESOs and provided by large corporations.
	Public entities may consider how existing policies may create barriers for new technologies offered by entrepreneurs and how, where relevant, these barriers can be reduced to encourage the development and use of products and services offered by entrepreneurs.	Investors may explore blended finance structures to adjust the risk return levels related to long R&D periods of climate tech companies and their need for higher up-front capital expenditures compared to software companies.	Training programs focused on angel investors, drawing attention to opportunities presented by climate tech companies, may be considered to promote angel investments and their focus on climate-related companies.
	Policy makers may consider promoting role models, providing opportunities for entrepreneurs to test and develop their products in partnership with public utilities.		

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