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APEC WOMEN IN STEM PRINCIPLES AND ACTION MONITORING FRAMEWORK

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Contents

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ACRONYMS

APEC	Asia-Pacific Economic Cooperation
ESG	environmental, social and governance
GISE	INWES' Gender Perceptions in Science and Engineering Survey
INGO	International Non-Government Organization
INWES	International Network of Women Engineers and Scientists
K-12	Kindergarten through Twelfth Grade (corresponds to primary and secondary school)
KII	key informant interviews
ILO	International Labour Organization
INGO	international non-governmental organization
INWES	International Network of Women Engineers and Scientists
N/A	not applicable
OECD	Organisation for Economic Co-operation and Development
PCT	Patent Cooperation Treaty
PISA	OECD Programme for International Student Assessment
PPSTI	Policy Partnership on Science, Technology, and Innovation
PPWE	Policy Partnership on Women and the Economy
R&D	research and development
SAGE	Science in Australia Gender Equity
SOM	APEC senior officials meeting
STEM	science, technology, engineering, and mathematics
STEAM	science, technology, engineering, arts and math
STIP	EC-OECD Science, Technology and Innovation Policy Survey
TBD	to be determined
TVET	technical and vocational education and training
UIS	UNESCO Institute for Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organization
UOE	UNESCO, OECD, Eurostat joint reporting database
U.S.	United States
US SEGA	US Support for Economic Growth in Asia
WIPO	World Intellectual Property Organization

v

INTRODUCTION

Building on work from 2016, the U.S., through the APEC Policy Partnership on Science, Technology, and Innovation (PPSTI) launched the *Women in STEM Principles and Actions* at the 2019 Women in the Economy Forum to distill discussions, lessons learned, and best practices from across the region. The Principles and Actions also provide guidance for governments, academic institutions, and firms on key approaches to promote women's engagement in science, technology, engineering, and mathematics (STEM).[1] The importance of women in STEM was further highlighted in the La Serena Roadmap for Women and Inclusive Growth (2019-2030) (hereafter, Roadmap), endorsed by APEC Leaders in 2019. The Roadmap includes a specific target to "increase the region's gender balance among STEM graduates in tertiary education, and in positions in research and R&D."

This high-level commitment highlights APEC's understanding that, while STEM fields are crucial to sustainable economic growth and prosperity, women remain underrepresented in STEM careers, comprising just 30 percent of scientific researchers worldwide.[2] Across APEC, the percentage of female graduates in STEM-related programs is as low as 15 percent in some economies.[3] Under-representation of women in STEM fields limits economies from utilizing women's unique contributions and therefore misses opportunities for innovation, adapted technology, and many other factors which contribute to economic growth. Addressing barriers to girls' and women's participation in STEM-related education and careers is critical to advancing economic growth in the Asia-Pacific and solving global issues through innovative solutions, including in the dual transitions to a digital and green/blue economy now transforming APEC economies. Despite the importance of the subject, and the work being done across APEC economies to address the issue, there continues to be a paucity of data on women in STEM across the APEC region and globally.[4] This makes it challenging for economies to monitor their progress implementing the Women in STEM Principles and Actions and working towards the Roadmap target.

The 2016 APEC Women in STEM Framework, which informed the Principles and Actions, reflects the multi-dimensional and intersectional nature of the challenges facing women in STEM and, as such, seeks to capture progress in achieving gender parity in: (i) education; (ii) employment; (iii) entrepreneurship; and (iv) the underlying social norms and the enabling environment which impact women's ability to enter, and remain in, STEM fields. The Women in STEM Monitoring Framework seeks to capture progress in all these areas, as visualized in Figure 1.

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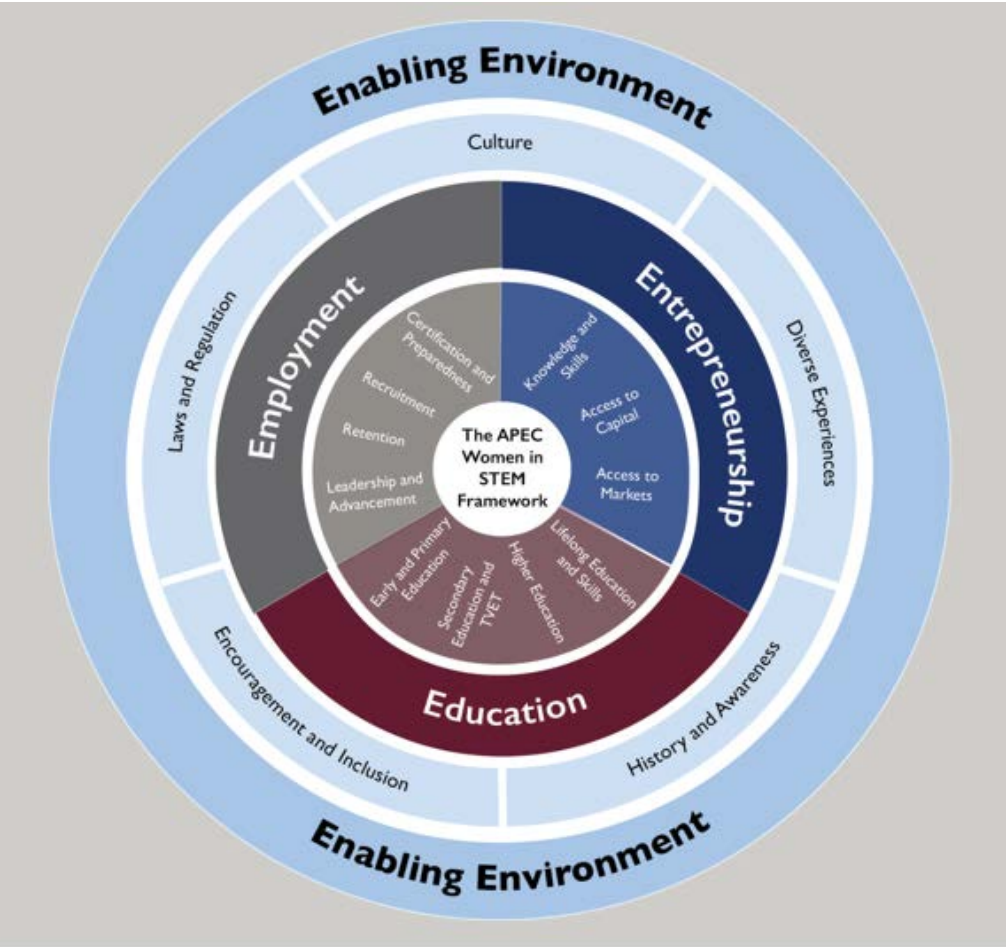
[1] There is no internationally accepted definition of "STEM" occupations. For the purposes of this Framework, US-SEGA has used the International Standard Classification of Occupations Category 08 (ISCO-08). This includes science and engineering professionals, health professionals, Research & Development and Information and Communications Technology. (See https://www.ilo.org/public/english/bureau/stat/isco/isco08/)

[2] "Women in Science." UNESCO UIS, February 18, 2020. http://uis.unesco.org/en/topic/women-science

[3] "APEC Women and the Economy Dashboard 2021." APEC Policy Support Unit, September 2021. https://www.apec.org/docs/default-source/publications/2021/9/the-apec-women-and-the-economy-dashboard-2021/221_psu-apec-women-and-the-economy-dashboard-2021.pdf?sfvrsn=b239ad0c_1

[4] For example, of four indicators on Women in STEM included in the APEC Women and the Economy Dashboard, there has only been sufficient data to report results for one indicator in two of the last ten years.

Figure 1: APEC Women in STEM Framework



Source: Reproduced from APEC Women in STEM. A Framework for Dialogue, Learning and Action (2016).

This Monitoring Framework is intended primarily for the Policy Partnership on Science, Technology, and Innovation (PPSTI), which endorsed the Principles and Actions, and is likely to be of interest to the Policy Partnership on Women and the Economy (PPWE), as it oversees implementation of the La Serena Roadmap.

OBJECTIVE

This report provides resources and guidance to key stakeholders, including APEC policymakers and interested partners in academia and the private sector, on how they can measure progress towards implementation of the APEC Women in STEM Principles and Actions. The collection and reporting of data against the Principles and Actions will help stakeholders guide their efforts to achieve full equity for women and girls from diverse backgrounds in STEM fields. Increasing gender-disaggregated data throughout the STEM pipeline is one of the actions under Principle 2 of the Principles and Actions. At the economy-level, monitoring the effectiveness of policies to promote women in STEM (and to document at baseline that women are under-represented along the pipeline) is often important to legitimize the allocation of adequate resources towards advancing women in all their diversity in STEM.

This report lays out a draft Monitoring Framework for the APEC Women in STEM Principles and Actions that includes a Theory of Change, Results Framework, and practical list of metrics (indicators) that economies may wish to adopt to monitor and report progress. The collection and reporting of data against the Principles and Actions will help APEC economies to aggregate stories around impact and learn about, and adopt, best practices.[5]

APPROACH AND METHODOLOGY

This Framework was developed using a combination of desk research and key informant interviews (KIIs). The desk research focused on determining how women in STEM is measured and benchmarked internationally. This included a review of research and analytical work by international (multilateral) organizations and research institutions working on women in STEM (see bibliography in Annex 1). In addition, the desk review sought to identify relevant datapoints currently being collected and reported in APEC economies. (These are summarized in Annex 3.)

Key informants were drawn from relevant ministries/departments/agencies, statistical agencies, researchers working on women in STEM, STEM employers (including public research institutions, educational institutions (vocational, tertiary, Ministries of Education) and others (see list of respondents in Annex 2). Economies were asked to nominate key informants in the first instance, and attempts have been made to cover a range of developed and developing economies from across the region. The KIIs were conducted by videocall using a semi-structured questionnaire. The proposed and achieved sample is shown in Table 1.

Table 1: Key Informant Interviews- Proposed and Achieved Sample

Respondent Type	Proposed Sample	Achieved Sample
Domestic statistical agency representative	5	5
Statistical Officer (or other relevant official) from Relevant Government Ministry counterparts (e.g., Science and Technology, Education, and Women's Empowerment)	15	13
Researchers, INGOs, international organizations, academia	15	12
Total	**35**	**30**

In the development of the framework, the following questions were examined:

[5] Increased availability of data would also support reporting of cross-economy results in the APEC Women in the Economy Dashboard or other indices that PPSTI may endorse in future.

- What does successful implementation and progress of the APEC Women in STEM Principles and Actions look like in practice?
- What data points should be tracked on the Principles and Actions to monitor progress in implementation?
- What stakeholders can provide the information to evaluate progress and how often?

CHALLENGES AND CONSIDERATIONS

In undertaking this work, the project encountered several issues that affect comparability of data across economies or otherwise impact the availability of data. Given the complexity of aligning the 21 APEC economies, no stance is taken on these issues, although any future attempt to compile a cross-economy reporting of Women in STEM progress which would need to discuss definitions for the purpose of cross-comparison. Some of the key issues include:

1. *Lack of a commonly accepted definition of STEM*. There is no universally accepted definition of what qualifies as a STEM field, although most statistical offices will define STEM occupations at ILO 4-digit level.[6] The following, non-exhaustive variations encountered among APEC economies are of note:
    - Inclusion/exclusion of the health care sector. While the international literature demonstrates that women are consistently under-represented in STEM field, such as IT, engineering, and some physical sciences, women are often over-represented in the health care sector, where they are commonly clustered in lower skilled, lower paid work.[7] The inclusion of the health care sector in employment data can therefore be misleading or distortionary as to equity outcomes if simple quantitative measures are applied to presence of women in STEM. Some economies and international organizations therefore purposively omit the health care sector from women in STEM data.
    - STEM or STEAM? Some economies prefer to broaden their policies to Science, Technology, Engineering, Arts and Math (STEAM). This results in these economies including humanities (e.g., social sciences) in their STEM data. The international literature indicates that women are generally over-represented in the social sciences and thus aggregate reporting on STEAM may mask subsectors where women's participation is lower than 50%.
2. *Diffuse and uncoordinated data collection.* Given the various sectors of activity involved along the women in STEM pipeline, relevant data points are usually collected by a variety of ministries, departments, and agencies. In decentralized or federal systems of government, data collection is spread across even more agencies. Coordination and aggregation challenges are starker for data that resides primarily in the private sector (e.g., wage, employment, finance, etc.).

    This review identified only two economies (Australia and Korea) where there is a government mandated and resourced effort to collate and report on women in STEM results across these various

[6] The International Standard Classification of Occupations (ISCO) uses 2-digit categories. The selection is similar to the list of STEM occupations selected by the U.S. Bureau of Labor Statistics (BLS) and O*NET.

[7] For economies that do include the health sector, it is recommended that they monitor progress in women reaching higher levels of seniority within the sector.

government departments. In both cases, this comprehensive data collection is supported by legislation on women in STEM. (Other economies tend to have more general gender equity work or dashboards, but not specific to women in STEM.)

3. *Data Comparability.* Definitions of indicators, data collection methods, and frequency of collection/reporting differ by economy and may impede aggregation or comparison across the region. Efforts such as UNESCO's *Measuring Gender Equality in Science and Engineering: The SAGA Toolkit* to develop a standardized set of women in STEM indicators appear to have had limited uptake. As a result, APEC policymakers should focus on their domestic progress comparatively and not compare one economy to another. This is similar to economy-reported data to the APEC Women and the Economy Dashboard.

4. *Intersectional Identities.* Some economies have moved to broaden their attention to diversity beyond disadvantages faced by women to include other aspects of social inclusion, such as disadvantaged minorities, disability status, people living in remote areas, and other traditionally under-represented groups. Data collection tools and data analysis in these cases may focus on women in all their diversity beyond the traditional "women in STEM" framework.

PROPOSED THEORY OF CHANGE AND RESULTS FRAMEWORK

Addressing the barriers to women in STEM along the pipeline is a complex effort requiring efforts by a wide range of actors across many sectors. When trying to evaluate the effectiveness of interventions to address such complex issues, it is good practice to develop a theory of change that makes explicit the assumed connections between efforts—policies, programs, and activities—and the ultimate intended outcomes. This requires articulating the expected causal relationships from the resources put into the activity (the inputs), to the immediate result of the activity (the output), to changes in knowledge, behavior, or capacity (the intermediate outcome), and finally to the end goal. In relation to Women in STEM, the literature emphasizes the importance of supporting girls and women all along the career pathway.[8] For the purposes of the Monitoring Framework, this can be expressed as a theory of change which underpins the APEC Women in STEM Principles and Actions as follows:

If **economies address underlying social, cultural, and economic barriers that dissuade or impede women from entering and progressing in STEM fields,**

and *if* educational institutions support girls and women to pursue and complete primary, secondary, vocational, and tertiary education in STEM-related fields,

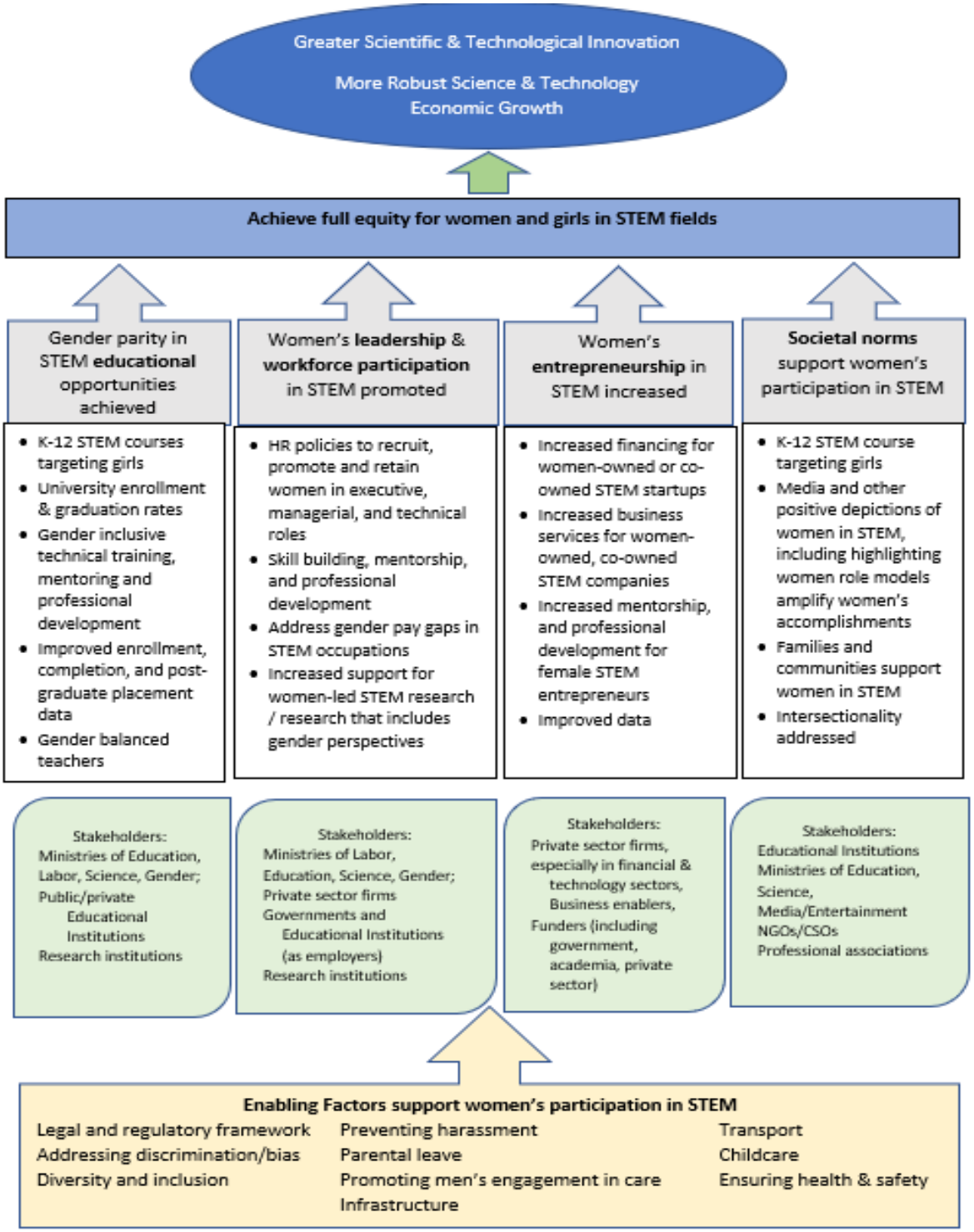
and *if* STEM employers effectively recruit, train, promote, and retain women, *and* women innovators, researchers and entrepreneurs have equitable access to finance, networks, and business development services,

then **women will have equity in STEM fields and economies will benefit fully from women's contributions to scientific and technological innovation and resulting economic growth**.

[8] For more on these challenges, see APEC Women in STEM. A Framework for Dialogue, Learning and Action (2016).

A generalized schema of the types of supportive interventions economies may wish to take in each of the relevant areas of education, workforce participation, entrepreneurship, societal norms, and enabling factors and their link to higher-level objectives is shown in Figure 2.

Figure 2: Proposed Results Framework for APEC Women in STEM Principles and Actions



PROPOSED METRICS (INDICATORS)

Based on the review of available data collected and published in APEC economies, a list of potential indicators that APEC economies may wish to collect and share is proposed in Table 2. As these data points are already available for several APEC economies, filling in reporting gaps among economies would allow APEC to provide a more comprehensive picture of progress going forward and would also allow individual APEC economies to benchmark their progress against the region (recognizing that the data is not directly comparable given that different data sources are using different definitions and methodologies). Specifically, regular publication of this data, and compilation of data for all economies into an index, would allow members of the PPSTI to demonstrate progress in achieving the Women in STEM Principles and Actions. These 19 indicators are not a comprehensive list of how economies are measuring women in STEM or could measure progress in this area. Rather, they are intended as a common starting point across APEC that can be built upon in future as the availability of gender disaggregated data increases. (The way in which the indicators map against the APEC Principles and Actions is shown in Annex 4.)

Table 2: Proposed Women in STEM Metrics

APEC Principle/ Action	#	Indicator	Source	Frequency	Number of Economies Available[9]
Education *Principle I (a)*	1	Students' science and mathematics mean score results (girls/boys)	OECD Programme for International Student Assessment (PISA)	Every 3 years	19[10]
Education *Principle I (a)*	2	Female share of enrollment in STEM programs, tertiary (%)	UIS/OECD/ Eurostat	Annual	7[11]
Education *Principle I (a)*	3	Female share of graduates from STEM programs, tertiary (%)	World Bank Gender Portal Data[12]	Annual	15
Education *Principle II (e)*	4	Proportion of women faculty in higher education institutions (STEM fields)[13]	Ministry of Education,	Annual	TBD

[9] In the case of international indices, this number can be determined. For other data points, economies will be asked to self-report whether they are collecting and publishing the data point as this work moves forward.
[10] Latest data (2018) includes all economies with the exception of PNG and Viet Nam. Viet Nam was included in the PISA exercise but the gender gap in math achievement is not reported in that year.
[11] KIIs indicate that most economies are collecting this datapoint but it appears that many are not sharing results with the (UNESCO, OECD, Eurostat joint reporting) UOE database for whatever reason.
[12] The World Bank calculations for this indicator use data from UIS. UIS has stopped reporting this data with the last available figures dating from 2017/2018. However, it appears that economies are still reporting to the UOE so the data point may be available through other multilaterals.
[13] This figure, when collected, is commonly disaggregated by public service grade or seniority/position, and salary level. Recent research finds that "for high-ability female students, being assigned a female professor leads to substantial increases in the probability of working in a STEM occupation and the probability of receiving a STEM master's degree." See Mansour, H. et al.

			Statistical Agency or equivalent		
APEC Principle/ Action	#	Indicator	Source	Frequency	Number of Economies Available
Employment *Principle II (e)*	5	Percentage of women among researchers	OECD STI Scoreboard	Annual	15
Employment *Principle I (b and c)*	6	Female share of the STEM workforce	ILOSTAT	Annual	6
Employment *Principle III (d)*	7	Median annual earnings of women in STEM as a share of median annual earnings of men in STEM	Statistics Bureau or Ministry of Labor (labor survey, corporate reporting, or general census)	Based on census data- varies	TBD
Employment *Principle II (b)*	8	Share of women in executive leadership positions in STEM corporations	Corporate annual reports or ESG indices	Annual	TBD
Employment *Principle II (b)*	9	Share of women in executive leadership positions in domestic, regional, and local STEM-related agencies	Government institutional reporting	Annual	TBD
Employment *Principle III (d and e)*	10	Number of STEM-related firms with HR policies on gender-based harassment and discrimination	Corporate annual reports, ESG indices, relevant government agencies	Annual	TBD
Employment *Principle III (d and e)*	11	Share of STEM workers who report experiencing or witnessing gender-based discrimination or sexual harassment in the workplace	INWES "Gender perceptions in Science and Engineering" (GISE) survey	Annual	TBD

APEC Principle/ Action	#	Indicator	Source	Frequency	Number of Economies Available
Entrepreneurship *Principle I (f) and Principle II (e)*	12	Share of [public] research funds (i) applied for and (ii) awarded to women applicants	Ministry of Science, Research Councils or other source of public R&D funds	Annual	TBD
Entrepreneurship *Principle II (f)*	13	Share of women inventors in Patent Cooperation Treaty (PCT) patent applications	WIPO Statistics Database	Annual	17[14]
Entrepreneurship *Principle I (f)*	14	Patent applications with at least one female inventor	WIPO Statistics Database	Annual	17
Enabling Factors *Principle I (e) and Principle II (c)*	15	Domestic policy mandating sex-disaggregated education and labor data in STEM fields (Y/N)	TBD	N/A	TBD
Enabling Factors *Principle III (c)*	16	Domestic policy to promote Women in STEM in place (Y/N)	OECD STIP Compass	N/A	TBD
Enabling Factors *Principle III (b)*	17	Domestic parental leave policy in place (Y/N)	ILO (forthcoming)	N/A	TBD
Enabling Factors *Principle I (d) and Principle II (a and d)*	18	Domestic public awareness campaign on the accomplishments and value of diversity in STEM conducted (Y/N)	TBD	N/A	TBD
Enabling Factors	19	Economy-level policy review conducted to identify legal	TBD	N/A	TBD

[14] The economies that are not available are: Hong Kong, China (data reported under China); Brunei Darussalam and Papua New Guinea (no applications lodged to date but this data would be available in that case); Chinese Taipei (not a member but Chinese Taipei does collect data on number of women who apply for patents. The ongoing APEC project "Empowering APEC Women Inventors: Patents as a Tool for Gender Equality" conducted research finding that only roughly half of APEC economies collect gender disaggregated data on domestic applications for patent protection (report forthcoming). The PCT data is not comprehensive but is more readily available.

Principle III (a)		and structural barriers to women in STEM (Y/N)			

CONCLUSION AND RECOMMENDATIONS

This review demonstrates that APEC economies are increasing data collection on Women in STEM, for example, it appears that most economies are collecting gender disaggregated education data, at least for public universities. However, challenges remain, including definitional issues, comparability and reliability of data, compiling data across the multitude of institutions involved in the Women in STEM ecosystem, and lack of policies and resources to fund regularly recurrent data collection and publishing (as opposed to one-off exercises). Monitoring progress in implementation of the APEC Women in STEM Principles and Actions across the 21 economies is an ambitious but realizable goal.

This proposed Monitoring Framework is submitted to PPSTI for consideration as a core set of metrics that APEC economies may wish to collect to monitor and demonstrate progress in promoting Women in STEM across the region. This list is limited and is not intended to be comprehensive; it can and should be added to as data collection efforts evolve. However, agreement on a core set of indicators, as a starting point, would allow APEC economies to begin monitoring their own progress (if they are not already doing this), identify what works to promote Women in STEM throughout the pipeline, and share progress and lessons learned with others. This would represent as an important first step to understanding how the Principles and Actions are being advanced and would also help APEC in other areas where it seeks to monitor gender equity (such as the Women in the Economy Dashboard and the La Serena Roadmap).

As next steps, it is therefore recommended that:

1. PPSTI members review, comment on, and share this Framework with relevant ministries and statistical agencies to understand the status of data collection on Women in STEM in their economy more fully. Annex 3 provides a preliminary scan of data availability in many economies but it is necessarily incomplete;

2. The U.S. proposes a series of workshops be held, starting at SOM3, to support economies' utilization of the Framework to collect and publish these datapoints on a regular basis and use this data to make evidence-based decisions regarding implementation of the APEC Women in STEM Principles and Actions. Potential topics could include:

    a. Sharing learning and good practices in APEC economies already producing these data points on their data collection and reporting systems;
    b. Identifying resources and support (e.g., training) that would be helpful for economies not yet collecting and/or publishing Women in STEM data;
    c. Brainstorming capacity building needs and sustainability plans for collecting, publishing, and applying Women in STEM data on a regular basis in all economies;
    d. Collaborating with the private sector to collect data on Women in STEM, particularly related to the gender wage gap, promotion of women from diverse backgrounds in leadership positions,

and good practices to create supportive work environments that attract and retain women to the STEM workforce;

e. Collaborating with the financial sector to increase available data on access to finance constraints for women entrepreneurs in STEM fields across APEC economies, ranging from small businesses needing bank financing to women entrepreneurs in tech startups seeking venture capital funding;
f. Increasing data and monitoring on STEM subsectors that are particularly important for economic growth, including information technology or green economy sectors (e.g. renewable energy), which are also fields where prevalence of women is often lowest;
g. Discussing how the data can be used to further strengthen support and resources for policy and programs in the area of Women in STEM;
h. Discussion of implementation steps and timeframe for an eventual Women in STEM Index that would allow APEC to demonstrate its progress over time in this important area; and
i. Adjustments to the Monitoring Framework for eventual PPSTI endorsement.

ANNEX I: BIBLIOGRAPHY

Academy of Sciences Malaysia, (2021), *Science Outlook 2020 Unlocking the Future,* Available at: https://www.akademisains.gov.my/studies/flagship/science-outlook/

Ahn, H., "Gender Equality in STEM: Korea's Policy for Women in STEM," Presentation on May 26, 2021. Available at: https://www.unescap.org/sites/default/d8files/event-documents/Session%201-3.%20Dr.%20Hye-yeon%20Ahn.pdf

Andrade Baena, G. (2021), STEM Indicators for México, Movimiento STEM, Ciudad de México. Available at: https://www.movimientostem.org/wp-content/uploads/2021/09/Reporte-de-Indicadores-STEM-para-Mexico-2021.pdf

APEC Women in the Economy Dashboard, (2021), Available at: https://www.apec.org/publications/2021/09/the-apec-women-and-the-economy-dashboard-2021#:~:text=The%20APEC%20Women%20and%20the%20Economy%20Dashboard%20is%20an%20initiative,in%20several%20aspects%20of%20life.

APEC Women in STEM: A Focus on Entrepreneurship. Making the Economic and Business Case (2018) Available at: https://www.apec.org/docs/default-source/publications/2017/2/apec-women-in-stem-a-framework-for-dialogue-learning-and-action/217_ppwe_apecwomeninstem_fn_print.pdf?sfvrsn=f5dc3e7d_1

APEC Women in STEM. A Framework for Dialogue, Learning and Action (2016). Available at: https://www.apec.org/Publications/2017/02/APEC-Women-in-STEM-A-Framework-for-Dialogue-Learning-and-Action

APEC Women in STEM Principles and Actions. (2019) Available at: https://www.apec.org/docs/default-source/groups/ppsti/2020/final-apec-women-in-stem-principles.pdf

Bello, Alessandro; Blowers, Tonya; Schneegans, Susan and Tiffany Straza (2021) "To be smart, the digital revolution will need to be inclusive." In: *UNESCO Science Report: the Race against Time for Smarter Development*. UNESCO: Paris. Available at: https://www.unesco.org/reports/science/2021/en

Bello, Alessandro (2020) *Women in Science, Technology, Engineering and Mathematics (STEM) in the Latin America and the Caribbean Region*, UN Women, Montevideo.

Center for Women in Science, Engineering and Technology, "Women & Men in Science, Engineering & Technology 2019". Available at: https://www.wiset.or.kr/eng/contents/policy_statistics.jsp?goDiv=center3

Chinese Institute of Engineers (CIE), "Survey on Career Development and Gender Differences of Engineers," 2019.

Chua, S., Kline, K., and Lim, S. "STEM Gender Gap in Singapore," Nanyang Technological University, March 2022. Available at: https://www.ntu.edu.sg/docs/default-source/default-document-library/powers/ntu_powers_stemgendergapinsingapore.pdf?sfvrsn=a2f34ed0_3/%20NTU_POWERS_STEMGenderGapInSingapore%20.pdf

Chilean Department of Studies and Strategic Management, National Research and Development Agency, "Report of Participation by Sex of the Inspector General 2016-2020", Ministry of Science, Technology, Knowledge and Innovation.

Chilean Ministry of Education (CONICYT), "National Reality in Training and Promotion of Women Scientists in Science, Technology, Engineering and Mathematics," December 2016 (unpublished PowerPoint presentation).

Chilean Ministry of Science, Technology, Knowledge and Innovation, Office of Studies and Statistics Division of Public Policies, "Scan of Gender in Science, Technology, Knowledge and Innovation," April 2022.

EC-OECD (2022), STIP Compass: International Database on Science, Technology and Innovation Policy (STIP), edition March 2, 2022, https://stip.oecd.org

Fry, R. Kennedy, B. and Funk, C., "STEM Jobs See Uneven Progress in Increasing Gender, Racial and Ethnic Diversity," Pew Research Center, April, 2021. Available at: https://www.pewresearch.org/science/2021/04/01/stem-jobs-see-uneven-progress-in-increasing-gender-racial-and-ethnic-diversity/ [Accessed on: 10.06.2022]

García, Laura & Serve, Blandine (2022), "Ending women's under-representation in science, technology, and innovation activities." OECD Directorate for Science, Technology and Innovation, 08 March, 2022. Available at: https://stiplab.github.io/datastories/gender/policy_note.html [Accessed 9.02.2020].

International Labour Organization Statistics (ILOSTAT) (2020) "How many women work in STEM?" February 11, 2020, Available at: https://ilostat.ilo.org/how-many-women-work-in-stem/ [Accessed 9.02.2020].

International Network of Women Engineers and Scientists (INWES) & The Association of Korean Women Scientists and Engineers (KWSE), "The 2021 Report on International Perceptions of Gender Barriers in STEM. Outputs and outcomes of the INWES-KWSE Pilot Survey "Gender perceptions in Science and Engineering" (GISE). December 2021. ISBN 979-11-951557-6-7.

International Science Council, 2020. *Gender Gap in Science - A Global Approach to the Gender Gap in Mathematical, Computing and Natural Sciences.* [Online] Available at: https://council.science/publications/gender-gap-in-science/ [Accessed 12 Jun 2021]

Kahn, Shulamit and Donna Ginther, "Women and STEM", NBER Working Paper No. 23525, June 2017. Available at: https://www.nber.org/system/files/working_papers/w23525/w23525.pdf.

Malaysian Department of Statistics, *Statistics on Women's Empowerment in Selected Domains Malaysia 2019*, Available at: https://newss.statistics.gov.my/newss-portalx/ep/epFreeDownloadContentSearch.seam?cid=114288 [Accessed on: 11.08.2022]

Mansour, H. et al, "The Effects of Professor Gender on the Post-Graduation Outcomes of Female Students" NBER Working Paper 26822, March 2020. Available at: http://www.nber.org/papers/w26822

Minano, S. (2019) *Peruvian Women and Patents: Inventing the Future,* INDECOPI

National Center for Science and Engineering Statistics, National Science Foundation, "*Diversity and STEM. Women, Minorities and Persons with Disabilities"* (2023), NSF 23-315. Available at: https://ncses.nsf.gov/pubs/nsf23315/

OECD, Programme for International Student assessment (PISA), 2018. Available at: https://www.oecd.org/pisa/publications/

Office of Research on Women's Health (2021). *Report of the Advisory Committee on Research on Women's Health: Fiscal Years 2019-2020.* Bethesda, MD: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health.

Oliver, Mary & Woods-McConney, Amanda & Maor, Dorit & McConney, Andrew. (2017). Female senior secondary physics students' engagement in science: a qualitative study of constructive influences. International Journal of STEM Education. 4. 10.1186/s40594-017-0060-9.

Osorio, M. (2022) *Statistical Compendium Record of Patents in Peru* 1990-2021, INDECOPI. Available at: https://www.patenta.pe/documents/2487468/2487652/Compendio+ENG.pdf/8b2167c9-87fb-ee38-880b-12e73c545625

Statistics Canada. Table 37-10-0144-01 Number and proportion of full-time teaching staff at Canadian universities by academic rank and gender

STEM Equity Monitor Data Report 2022, Australian Government Department of Industry, Science and Resources. STEM Equity Monitor ISSN: 2652-5321

Tambourine Innovation Ventures, "Empowering APEC Women Inventors: Patents as a Tool for Gender Equality," presentation at webinar held 29 November, 2022 for APEC Intellectual Property Rights Experts Group (IPEG), Project IPEG 02 2021.

UNESCO, 2017. *Measuring Gender Equality in Science and Engineering: The SAGA Toolkit Working Paper 2.* [Online] Available at: http://uis.unesco.org/sites/default/files/documents/saga-toolkit-wp2-2017-en.pdf.

UNESCO, 2018. *The SAGA Survey of Gender Equality STI Policies and Instruments, SAGA Working Paper 3*, Paris.

UNESCO Institute for Statistics (UIS), Changes to content and format of UIS June 2022 Research and Development (R&D) data release, Internal Report, June 2022.

UNESCO "Women in Science," UIS Fact Sheet No. 55 | June 2019.

UNESCO (2021) UNESCO Science Report: The Race Against Time for Smarter Development. S. Schneegans, T. Straza and J. Lewis (eds). UNESCO Publishing: Paris.

WIPO, "Guidelines for producing gender analysis from innovation and IP data" Available at: https://www.wipo.int/publications/en/details.jsp?id=4588 [Accessed 10.06.2022].

World Bank, Gender Data Portal, Available at: https://genderdata.worldbank.org/

ANNEX II: LIST OF INFORMANT INTERVIEWS

Economy	Organization Represented
Australia **(Co-sponsor)**	Department of Industry, Science and Resources Office of the Women in STEM Ambassador Science in Australia Gender Equity Ltd
Canada	Natural Sciences and Engineering Research Council of Canada Statistics Canada / Government of Canada
Chile	Ministry of Science, Technology, Knowledge, and Innovation
Republic of Korea	Dongseo University
Malaysia	Academy of Sciences Malaysia
Peru	National Council of Science, Technology and Technological Innovation (CONCYTEC) National Institute for the Defense of Competition and the Protection of Intellectual Property (INDECOPI)
Philippines	Science Education Institute (SEI), Department of Science and Technology (DOST)
Singapore	Nanyang Technical University United Women Singapore
Chinese Taipei	National Taiwan University of Arts
United States	National Institutes of Health (NIH) U.S. Census Bureau
APEC	APEC Policy Support Unit
Multilateral Organizations	ILO OECD UNESCO World Intellectual Property Organization (WIPO)
Non-Governmental Organizations	International Network of Women Engineers and Scientists (INWES)

ANNEX 3: WOMEN IN STEM DATA SOURCES

A summary of the various data sources on women in STEM identified through the research for this paper is provided below. (This information is not intended to be comprehensive.)

Table 3: Multilateral and International Non-Governmental Organization Data Sources

Organization	Datapoint
APEC	The APEC Policy Support Unit (PSU) annually publishes the APEC Women in the Economy Dashboard which compiles indicators in the following areas: 1) access to capital and assets; 2) access to markets; 3) skills, capacity-building and health; 4) leadership, voice and agency; and 5) innovation and technology.
EU-OECD STI Policy (STIP) Compass	STIP maintains a database of policy initiatives to increase women in STEM based on surveys of member economies. The database currently compiles 200 policy initiatives from 47 economies and the European Union (EU) and 70 strategies and plans targeting gender imbalance in 30 economies and the EU.
International Labour Organization (ILO)	The ILO is currently undertaking a study on parental leave disaggregated by sector (anticipated for mid-2023). They have not confirmed whether this will be a regular exercise.
International Network of Women Engineers and Scientists (INWES)	The International Network of Women Engineers and Scientists (INWES) & The Association of Korean Women Scientists and Engineers (KWSE) conduct an annual survey on "International Perceptions of Gender Barriers in STEM". This is a perception-based survey of women and men in STEM fields and includes questions related to equity in STEM education and the workplace. The 2021 edition included results for Japan and Korea but the survey is open to all economies and any economy with a minimum of 100 respondents will be reported in the data. Methodology: Respondents are asked to indicate their level of agreement with statements such as "Women in STEM receive equal work distribution and work appraisals compared to men of the same qualifications and level." There are also

	questions asking respondents whether they have direct or indirect experience of gender barriers such as: "Women in STEM being disadvantaged in receiving promotions, grade appraisal, research funds or scholarships because she is female."
OECD Education at a Glance	EAG includes a data point: Share of women among new entrants to tertiary education, STEM
OECD Gender Data Portal	Compiles all gender disaggregated data available across the organization, (not specific to women in science and technology). Data available in the areas of employment, education, entrepreneurship, health, development, and governance. Examples of possible data points of interest include: • Difference between men's and women's average earnings, as % of men's earnings. Median earnings. Full-time employees only. • Length of Maternity Leave • Length of paid father-specific leave
OECD Science, Technology and Innovation (STI) Scoreboard	The OECD STI Scoreboard contains over 60 indicators on women and gender across different dimensions of science, technology and innovation. These include statistics on women working as researchers, inventors and doctorate holders. They also map women's enrolment and graduation at tertiary and doctoral level, showing the fields in which, they are under- or overrepresented.
OECD Science, Technology and R&D Statistics	This database includes data on R-D personnel by sector of employment and qualification. Number of R&D personnel is provided in headcounts and/or full-time equivalent on R&D by sex, sector of employment (business enterprise, government, higher education, and private non-profit) and by formal qualification (university and other diplomas by ISCED classification). Data are presented from 1981 onwards. Data is available for Canada, Chile, Japan, Singapore and Chinese Taipei from 2010-2019 (See: https://stats.oecd.org/#) and is obtained through the International Survey of the Resources devoted to R&D. • Researchers by sex, sector of employment and field of research, in full-time equivalent on R&D; • Researchers by sex, sector of employment and field of research, in headcounts.
UNESCO Institute for Statistics (UIS)	UNESCO published two datapoints based on reporting by member states: • Percent of researchers who are women. Extent to which these women work in the public, private or academic sectors, as well as their fields of research.

	• Enrolment and graduation ratios disaggregated by sex and type of program; enrolment rates in private and public institutions; and graduates by field of study. **Note: UIS is no longer publishing these indicators as of 2022.**
UNESCO Science Section	Publishes a Science Report every five years (most recently in 2021, with the next edition anticipated for 2026). The 2021 edition includes a chapter on women in technology which compiles data from private sector as well as government.
World Intellectual Property Organization (WIPO)	The PCT Yearly Review includes the following data points: • Share of women inventors in Patent Cooperation Treaty (PCT) patent applications • Patent applications with at least one female inventor Methodology: WIPO attributes gender to their IP collections based on gender-name dictionaries. Patent applications submitted to WIPO are analyzed using the gender-name dictionary and the gender data is published annually (usually in February of each year). Data disaggregated for all APEC regions is not published but can be obtained by contacting WIPO directly.

Table 4: Economy-Specific Data on Women in STEM

Economy	Organization	Datapoint
Australia	Department of Industry, Science and Resources	Published annually, the STEM Equity Monitor Data Report brings together data on women in STEM from across 19 government agencies and departments. Data points are provided for all stages of the women in STEM pipeline. A sampling includes: • Attitudes of secondary school students towards STEM subjects and gender disaggregated high school math outcomes; • Technical and Vocational Education and Training TVET and university enrollment and completion rates in STEM subjects; • Placement and career progression (including wages) of STEM graduates of TVET and university programs (including a longitudinal analysis of university students); • Women's prevalence in teaching and research roles as well as success in acquiring research funding; and

		• Gender equity (at management and executive levels) and pay gap in the private and public sector. Of particular note, graduates of Australian higher education institutions take the Graduate Outcomes Survey conducted by the Social Research Centre approximately 4 months after completing their courses and all private sector firms with more than 100 employees are required by law to report data on workplace issues (e.g. composition of the workforce, salaries, existence of sex-based harassment and discrimination polices, etc.) to the Workplace Gender Equality Agency.
	Science in Australia Gender Equity (SAGE)	SAGE publishes data on gender equity in higher education with sex disaggregated data by discipline at the undergraduate, postgraduate and faculty seniority levels. They also publish applications for the various Award levels which include data at the institutional level such as workforce and student data and action plans to address barriers to attraction, retention, and progression of women.
Canada	Statistics Canada	Statistics Canada conducts several surveys that include data on Women in STEM although the data is not presented in one place. Various sources are described briefly below: 1. **University and College Academic Staff System - Full-time Staff (FT-UCASS)** – this is an annual survey of universities focused on staff. The data points published from this survey include: • Number and proportion of full-time teaching staff at Canadian universities by academic rank and gender (Table: 37-10-0144-01) • Number and median age of full-time teaching staff at Canadian universities, by highest earned degree, staff functions, rank, sex (Table: 37-10-0077-01) • Number and salaries of full-time teaching staff at Canadian universities (Table: 37-10-0108-01) • Number and distribution of full-time academic staff at Canadian universities by age group, gender and province (Table: 37-10-0228-01) Data is released annually and there is a dedicated table on gender. The next release will be in mid-December for 2021-22 data. 2. **The Postsecondary Student Information System (PSIS)** - another annual national survey focused on students. Information collected from tertiary institutions includes sex disaggregated data on students such as enrollment and graduation rates at each level of tertiary education (B.A, M.A., PhD).

		3. **Canadian Centre for Education Statistics (CCES)** – publishes the following indicators: • The share of women studying in STEM fields at Canadian colleges and universities • The share of STEM college and university graduates who are women • The persistence and graduation rates of women in STEM fields of study • Employment income of women graduating from STEM fields of study* 4. **Labour Force Survey** - allows for a headcount of women working in the sciences as well as work in the sciences as a share of all women's occupations. • Number of women working in "natural and applied sciences and related" occupations (Table: 14-10-0298-01)** In addition, Statistics Canada collects data on prevalence of women on Boards of Directors and data on women-owned enterprises. However, these reports are not disaggregated by sector of activity. 5. **Sex, Gender and Sexual Orientation Statistics** – while not specific to STEM, Statistics Canada compiles data tables to monitor the Government's Gender Results Framework (here) which includes data on aggregate economic participation. **This data point is generated by linking the tax payer identification of students graduating from STEM degrees with subsequent earnings. However, it is not possible to determine that earnings are from jobs in STEM.* *** Canada and the U.S. use different categories of STEM occupations then the OECD definition.*
	Natural Sciences and Engineering Research Council of Canada	Publishes data on what percent of its research awards go to women at NSERC - Equity, Diversity and Inclusion (nserc-crsng.gc.ca). The CRCC annual reports at Publications - Canada.ca Note that the indicator is "Proportion of award holders who are underrepresented individuals" as they disaggregate beyond Gender to other diversity and inclusion parameters.
	Ministry of Education	Publishes data on participation in Undergraduate and Postgraduate education:

Chile[15]	Higher Education Information Service (SIES)	• Proportion of women in first year enrollment by type of institution and Field of Study and by level of tertiary education (undergraduate/Msc/PhD) • Proportion of women graduating type of institution and Field of Study
	Ministry of Science, Technology, Knowledge and Innovation	In order to monitor the implementation of the National Policy on Gender Equality in Science, Technology, Knowledge and Innovation of the Ministry of Science (2021), the Office of Statistics produces an annual report, The State of the Art of Gender Gaps in STI, compiling data from across Ministries. They also directly conduct data collection through a number of surveys: a career survey of professionals with Doctorates, a research and development survey. The report also uses data from the Directory of scientific-technology companies which allows for disaggregation of firms by field of activity and sex of owner/manager. Available datapoints (included in the annual Scan of Gender STI) include: • Percentage of women who are researchers • Percentage of women who graduate with STEM degrees • Percent of women enrolled by STEM area • Percent of women academics • Number and percentage of people with doctorates working in universities • Percent of women in R&D • Distribution of productive authors of academic articles by field by sex • Percent of female inventors requesting patents • Percentage of women authors with indexed works • Percentage of women with doctoral degrees who have published • Average financing of projects according to gender of the project director • Percentage of public research projects awarded to women • Percentage of women with PhDs who have created companies (as a share of all PhDs who have started companies) • Percent of Science-Technology Based Companies with women leaders
	National Research and Development Agency (ANID)	ANID has a page on their website that brings together various studies on women in STEM. Some of the data points they publish related to research funding include: • Number of research funding applicants (by sex, by status (awarded, not awarded)

[15] Note that Chile's policy supports women in STEAM, and thus includes social sciences and humanities in their data.

		• Award rate (Female/Male) (%) • Award by Sex, by Year, by Field of Study
Republic of Korea	Center for Women in Science, Engineering and Technology (WISET)	Publishes the annual report Women & Men in Science, Engineering & Technology, which compiles data across a large number of government agencies to provide a comprehensive picture of women along the STEM pipeline. A sample of datapoints include: • Gender share of college entrants to STEM fields (by major, by region) • Gender share of college graduates (by degree) • Post-graduation employment rate (by sex, by field, by marital status, by type of employment, by type of institution) • Share of women R&D workforce (by type of institution, by position, by region) • Gender share of the STEM R&D workforce (by title, by age, by promotion rate and management title, by type of institution) • Number of women with career interruptions in STEM (by status, by age) • Share and number of institutions complying with workplace childcare facilities requirements • Share and number of institutions implementing parental leave (by type of institution) • Number of employees on parental leave and number of parental leave cover jobs • Share of women among new hires (compared to existing workforce) in institutions mandated to establish quotas for women in hiring under the law
Malaysia	Academy of Sciences, Malaysia	Publishes the Science Outlook report every three years (editions from 2017, 2020, next in 2023). This includes some data on women's graduates (tertiary) in STEM fields, women's share of the STEM workforce, and women researchers. The report also highlights the achievement of women scientists in Malaysia.
	Department of Statistics Malaysia	Publishes an annual report Statistics on Women's Empowerment in Selected Domains that includes data on: • Number of enrolments by field of study at higher education institution and sex. Data is disaggregated by public/private higher education institution. Fields of study include: Science, Mathematics and Computing and Engineering, Manufacturing and Construction. • Faculty numbers disaggregated by sex are available (but not by faculty or field of study) • Labor data disaggregates men and women by job title/level (e.g. manager, professional) but does not disaggregate for STEM fields specifically

		• Wage information (median and mean monthly salaries) for men and women by job title/level as above but not by sector • Note that these last two data points are available because Malaysia requires companies to include a Gender Diversity Index in their annual reports. (There is also a requirement that corporate boards comprise at least 30% women.)
Peru	National Council of Science, Technology and Technological Innovation (CONCYTEC)	CONCYTEC maintains a database of registered researchers eligible for government funding (available here). The database provides a breakdown of the percent of women and men registered and is updated regularly.
	National Institute for the Defense of Competition and the Protection of Intellectual Property (INDECOPI)	INDECOPI publishes a dashboard on patent and trademark applications which includes a breakdown of inventors filing applications by sex. INDECOPI collects the following gender disaggregated datapoints: • Share of patent applications filed by Peruvians, according to inventors´ gender • Share of women listed as inventors in patent applications filed by Peruvians • Share of patent applications filed by Peruvians, according to International Patent Classification (IPC) • Patents vs Utility Models filed by Peruvians • Number of patent applications filed by Peruvians, by type of applicant and inventors' gender
	National Superintendent of Higher Education (SUNEDU)	SUNEDU publishes a biennial report on the state of higher education, the "Biennial Report on the University Reality in Peru," that includes a chapter on gender gaps in the university. Datapoints include: • Undergraduate enrollment (by broad field of study) • Salary of women graduates • Distribution of faculty positions by grade/gender
	Ministry of Education	Publishes the Education Statistics Digest which includes data on enrollments and completions from primary through tertiary. Data is shown by institution, not field of study, which may lead to undercounting of STEM students. Relevant datapoints that are sex disaggregated include: • Enrollment in Universities, Polytechnics, Full-Time (by sex, by institution) • Graduation from Universities, Polytechnics (by sex, by institution)

		In addition, the Institutes of Higher Learning (IHLs) conducts annually a Graduate Employment Survey (GES) of all graduates six months after completion of their degree. This provides data on employment status and wages of new graduates. Unfortunately, this data does not appear to be gender disaggregated.
	Ministry of Economic Affairs, Intellectual Property Office	• Publishes number of patent applications filed by female residents (and as a percentage of total patent applications). This data is disaggregated by International Patent Classification (IPC).
Philippines	Department of Science and Technology (DOST) Science Education Institute (SEI)	SEI collects sex disaggregated data on science scholarship recipients (also disaggregated for low-income and indigenous recipients) and participants in STEM secondary school promotion activities. SEI also conducts surveys of promotion activity participants to gauge how many go on to declare STEM majors in tertiary education and surveys scholarship graduates to determine how many go into STEM careers (see https://www.sei.dost.gov.ph/images/downloads/publ/pubTracerFeb2019.pdf). In addition to publishing the annual Tracer fact sheet, every five years SEI publishes a more in-depth report on Women in STEM using census data from the Philippines Statistical Agency, available here: https://www.sei.dost.gov.ph/images/downloads/publ/pubWomenInScience.pdf
Singapore	Ministry of Education	Publishes gender statistics, which are updated annually. Available datapoints include: • Enrollment in Tertiary– by Broad Field（11 categories and Genders (Person) • Number of Students in Universities, Colleges and Junior Colleges – By Broad Field（11 categories) and Gender (Percentage) • Number of Students in Universities, Colleges and Junior Colleges – By Broad Field（27 categories) and Gender (Person) • Percentage of Students in Universities, Colleges and Junior Colleges – By Broad Field（27 categories) and Gender (Percentage) • Number of Teachers in Universities and Colleges - By Genders, Fields of Study, Tri-Category and Positions • Number of Teachers in Junior Colleges - By Genders, Fields of Study, Tri-Category and Positions Data is disaggregated by sector as follows: (i) Natural sciences, mathematics and statistics, (ii) Information and communication technologies, and (iii) Engineering, manufacturing and construction.

Chinese Taipei	Ministry of Education	The Statistics Office of the MoE publishes sex disaggregated tertiary education data (available here). Published datapoints include: • Number of students in colleges and universities - by field, level and sex (Table 106-3) • Number of Graduates of Colleges and Universities - by Field, Level and Sex (Table 106-30) • Percentage of women graduating in science, technology, engineering and mathematics in tertiary education (Table 106-32) • Proportion of female graduates in engineering, manufacturing and construction in higher education (Table 106-33) Sex disaggregated data on faculty of universities and technical colleges is also available (here) including the data points: • Number of full-time teachers and teaching assistants in technical colleges—by gender, subject, department, and teacher level (Table 306-4) • Number (Percentage) of full-time teachers in colleges and universities - by rank, gender and subject (Table 306-10/11)
	Intellectual Property Office	Collects the following datapoints: • Share of patent applications filed by female residents out of the total number of patent applications filed by residents • Share of patents granted to female residents out of the total number of patents granted to residents
	National Science & Technology Council	Published data on the gender of Commission staff and officials. Published data on applications and approvals for research funding. However, the most recent year published is 2015. Data points included: • Number of men/women applying for grants • Number of men/women approved for grants • Value of grant applications by men/women • Value of approved grants by men/women

United States	National Center for Science and Engineering Statistics, (NCSES) National Science Foundation	Every two years, NCSES publishes the *Diversity in STEM* report (available here) compiling data from the U.S. census bureau as well as surveys on education, the workforce, and college graduates. The report includes women's share of enrollment and degrees earned in STEM related fields, workforce data (including median age and salary differentials of science-related workers), and unemployment incidence among science graduates. Beginning with this year's edition (2023), NCSES is broadening its definition of workers in STEM to include not only those with a relevant tertiary degree but also people with technical skills including those with vocational and/or skills gained on-the-job. In addition to gender, the data also looks at ethnicity and disability status. The NCSES also produces the State of U.S. Science and Engineering 2022 every two years which includes some of the same datapoints on women's share of enrollment and degrees in STEM. The report also includes data on number of citations of scientific publications, which can be found here: 2021 *Publications Output*. NCSES is the reporting agency for the OECD statistic on proportion of women researchers. In relation to women faculty in STEM fields, the NCSES report The STEM Labor Force of Today includes a table on "Science, engineering, and health doctorate holders employed in academia, by type of position, sex, and degree field."
	National Science Foundation	The NSF also conducts an annual review of its research grant award process to ensure that funds are being awarded fairly. This includes an examination of how many women apply for and receive research funds from the NSF. The most recent report is available here: NSF Merit Review Progress Digest.
	National Institutes of Health (NIH)	NIH monitors women in STEM both as regards women's health and also women as workers in NIH-funded research and NIH itself as an institution. Regarding women's health (Principle 2e), the NIH monitors the prevalence of females as research subjects to ensure compliance with policies that require a legislated 50% minimum in human clinical trials and male and female subjects for pre-clinical trials. The NIH Working Group on Women in Biomedical Careers seeks to promote the entry, recruitment, retention, and sustained advancement of women in biomedical and research careers. The Working Group has a specialized website (available here) that highlights the achievements of women in the sciences and offers resources to support and promote the entry, recruitment, retention, and sustained advancement of women in

		biomedical research careers. This includes funding to incentivize research institutions to provide leave to caregivers and to hire people coming back from leave. Published data on Women in STEM includes: • The NIH Report of the Advisory Committee on Research on Women's Health: Office of Research on Women's Health publishes a biennial report (available **here**) that includes a chapter assessing gender in the NIH workforce including roles, programs, and occupations of women in the NIH workforce. The most recent edition will report on promotion and leadership rates of women and men for the first time. The report also includes information on NIH grant funding by sex and/or gender, race, and ethnicity as well as the inclusion of women and racial and ethnic minorities in NIH-funded clinical research. • The NIH Databook – (available here) provides sex disaggregated data on grantees including number of grants, types of grants, success rates, and funding amounts. The Data Book includes national statistics on graduate enrollment and post doctorates, by gender, by field of study. The NIH also monitors incidents and proven cases of sexual harassment in NIH funded labs and has the authority to take action in cases where there are proven cases of sexual harassment by grantees or grantee institutions.
	U.S. Census Bureau	The annual *American Community Survey* (ACS) household survey collects information on occupation and earnings that are sex disaggregated. Data is coded against 70 STEM occupations and STEM-related occupations (typically health care). The data tables are published annually and can be accessed by the public for analysis. The most recent data set (2019) can be found at STEM and STEM Related Occupations by Sex and Median Earnings. Data is also available disaggregated by age and race. The Census Bureau does not issue a regular report on Women in STEM but has produced several special reports on the subject including: The Intersectionality of Sex, Race, and Hispanic Origin in the STEM Workforce Disparities in STEM Employment by Sex, Race, and Hispanic Origin The Relationship Between Science and Engineering Education and Employment in STEM Occupations

		Who Are the STEM Workers Under Age 25? Does Majoring in STEM Lead to a STEM Job After Graduation? Women Making Gains in STEM Occupations but Still Underrepresented
	U.S. Equal Employment Opportunity Commission	Under the Equal Employment Opportunity Act, firms with more than 100 employees are required by law to report workforce data including data by race/ethnicity, sex and job categories to the EEO. Data sets with the employment statistics (and enforcement and litigation statistics) are published on their website. Employment statistics can be searched by North American Industry Classification System (NAICS) code (professional, scientific and technical services being the closest category to STEM). While the data is not sector specific, the EEOC does produce special reports including a recent one on the performance of the High-Tech industry which can be accessed **here**. This includes information on share of senior executives who are women.

ANNEX 4: MAPPING OF PROPOSED METRICS AGAINST THE APEC WOMEN IN STEM PRINCIPLES AND ACTIONS

Principle	Action	Proposed Indicator (note some indicators are relevant to more than one action)
Principle 1: Women in STEM Are Critical to Sustainable Economic Growth and Robust Science and Technology	a. Inspire, encourage, and provide effective and appropriate **education, training, mentorship and professional development** for women and girls in STEM, beginning at an early age and throughout careers especially the underprivileged and those in rural and remote areas.	Students' science and mathematics mean score results (girls/boys) Female share of enrollment in STEM programs, tertiary (%) Female share of graduates from STEM programs, tertiary (%)
	b. Champion equity, equal opportunities, access, enabling environments, and infrastructure for women and girls to learn, progress, and re-enter STEM fields.	Female share of the STEM workforce
	c. Provide leadership to engage, recruit, retain and enable women and girls in STEM with a special focus on maintaining continuity in the women in STEM pipeline.	Female share of the STEM workforce
	d. Educate and encourage all people, including families and communities, on the values of promoting, supporting, and engaging women and girls in STEM.	Domestic public awareness campaign on the accomplishments and value of diversity in STEM conducted (Y/N)
	e. Publicly acknowledge and celebrate, with evidence and data, the contribution that women in STEM make to economic growth.	Domestic policy mandating sex-disaggregated education and labor data in STEM fields (Y/N)
	f. Design and implement inclusive organizational and business practices, including increased funding and other support for enterprise development for women-owned STEM businesses and	Share of [public] research funds (i) applied for and (ii) awarded to women applicants

	integration of services and products from women entrepreneurs into procurement.	Share of women inventors in Patent Cooperation Treaty (PCT) patent applications Patent applications with at least one female inventor
Principle 2: Increased Representation of Women in STEM Matters	a. Promote educational materials, programs, hiring panels, expert review panels, and other engagements that prioritize and value diverse representation and empower women and girls in STEM.	Domestic public awareness campaign on the accomplishments and value of diversity in STEM conducted (Y/N)
	b. Examine gender and other types of diversity in leadership at all levels, across all sectors and disciplines, and identify and correct barriers that may be contributing to gender gaps.	Share of women in executive leadership positions in STEM corporations Share of women in executive leadership positions in domestic, regional, and local STEM-related agencies Share of women on boards of STEM-related firms or institutions
	c. Increase the creation, collection, evaluation, and sharing of gender-disaggregated data on STEM participation across all sectors and disciplines throughout the STEM pipeline.	Domestic policy mandating sex-disaggregated education and labor data in STEM fields (Y/N)
	d. Engage, support, and amplify the accomplishments of women and girls from diverse backgrounds in STEM-related programs.	Domestic public awareness campaign on the accomplishments and value of diversity in STEM conducted (Y/N)
	e. Embed gender perspectives in the design and conduct of research.	Proportion of women faculty in higher education institutions (STEM fields) Percentage of women among researchers Share of [public] research funds (i) applied for and (ii) awarded to women applicants

Principle 3: Overcoming Social, Cultural, and Economic Barriers Women in STEM face is Important	a. Promote the elimination of legal and structural barriers that inhibit women and girls in STEM as students, researchers, workers, entrepreneurs, and leaders.	Economy-level policy review conducted to identify legal and structural barriers to women in STEM (Y/N)
	b. Address barriers that prevent men from fully sharing unpaid care and domestic work and supporting women in STEM.	Domestic parental (maternal and paternal) leave policy in place (Y/N)
	c. Promote the creation and implementation of laws, policies, regulations, programs, and partnerships that create enabling environments for lifelong STEM education and skill building for girls and women.	Domestic policy to promote Women in STEM in place (Y/N)
	d. Promote the creation and implementation of policies for equal pay, provision of childcare, equal leadership, equal opportunities, non-discrimination, gender-responsive workplaces and health, safety and well-being for women and girls in STEM.	Median annual earnings of women in STEM as a share of median annual earnings of men in STEM Number of STEM-related firms with HR policies on gender-based harassment and discrimination Number of STEM workers who report experiencing or witnessing gender-based discrimination or sexual harassment in the workplace
	e. Create environments where women feel safe, including from sexual harassment.	Number of STEM-related firms with HR policies on gender-based harassment and discrimination Number of STEM workers who report experiencing or witnessing gender-based discrimination or sexual harassment in the workplace