Importance of Inclusion in the Vision of New CSIR!

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Plan of the talk

CSIR and its importance in India's STI ecosystem!

Why diversity and inclusion is an important aspect of activities which bring benefits of science to society.

What diversity will I focus on?

Why enterpreneurship is particularly relevant in the context of women in Science.

Many avenues these days to pursue this path

CSIR : Happy Founder's Day!

CSIR part of the trimuvirate that is leading India's march on path of Science , Technology and Innovation (STI) Viz. 1)UGC, 2)Science Departments of GOI and 3) CSIR Dealing with education, research and innovation to guide the country on the path to progress.

Personally, CSIR gave me a Research Associateship for a few months as a young researcher when I was in between jobs!

I have been involved in various capacities with CSIR, mainly the extra mural research division, given somewhat esoteric nature of my own science pursuits, including the mentor editor of the 'Indian Journal of Pure and Applied Physics' of CSIR!

CSIR : Vision!

From the web page:

"Pursue science which strives for global impact, technology that enables innovation – driven industry and nurture trans-disciplinary leadership thereby catalyzing inclusive economic development for the people of India"

After 75 years of independence and four score years of its existence CSIR is redefining itself with changing times!

CSIR : Vision! (further from the webpage)

Science and Engineering leadership.

Innovative technology solutions

Open innovation and crowd sourcing

Nurturing talent in transdisciplinary areas

Science based entrepreneurship

Socio-economic transformation through S&T interventions.

Some thoughts on STI and society in general

It is clear that one needs science, technology and innovation to bring the fruits of the new developments to the society.

When this comes together with the enterprenual spirit it adds economic development to the list of benefits.

We have myriad of examples , particularly in the context of the Covid-19 Pandemic:

- Vaccine development
- Development of rapid , accurate and in-field testing protocols
- Designs of inexpensive of ventilators

Few thoughts on entrepreneurship in general

Encouraging innovations which will bring applications of S&T to society is part of CSIR mission and program. Two of the points from the web page:

Science based entrepreneurship

Socio-economic transformation through S&T intervention.

'Diversity, Equity and Inclusion' are very important part of the journey on this road!

E & Inclusion / Diversity and all that

Diversity in scientific processes means participation of different diverse groups: it can be diversity of gender, language, social/economic class, geographical region, physical abilities, knowledge systems…

Some groups are underrepresented

Achieving diversity means Inclusion for those groups which are excluded, for historical reasons (example traditional knowledge systems) and equity for those under-represented groups where some inclusion exists (example gender)

Need for DEI in Science

Of course, one of the motivations for DEI in science is to correct historical injustices and the resulting exclusion of different groups from processes of science.

But it is equally important to realise that inclusion and diversity can only aid in increasing the efficacy of scientific processes by adding more dimensions to the scientific ecosystem which can lead to further excellence in S&T.

To quote Dharampal

Dharampal (whose birth centenary we celebrate this year) opined:

It is not the Shastras and pundits that preserved our cultures and traditions but the women and shudras!

When we talk of accessing the traditional knowledge systems essential to access the knowledge base of all sectors of society!

Diversity, Equity and Inclusion need to be practiced because they are good for STI!

Who we are affects what science we do!

Who we are affects what we do.

Science is objective and universal but

Issues in science one chooses to investigate, processes that are put in place can be influenced by cultural or gender background!

It takes a Shalini Arya to do research on newer methods of preservation of traditional foods such as chapatis!

Diversity : Gender and Knowledge systems

I will talk about importance of inclusion in the context of gender and knowledge systems for three parts of CSIR mission stated on its web page

Science and Technology Leadership
Science based Entrepreneurship

Socio-Economic development through STI

STIP-2020?

Science, Technology and Innovation Policy (**STIP**) of India released in January 2021 has taken a big step by having a separate discussion of E&I

The discussion cuts across all issues ..previously one had a separate discussion for gender equity another for including those on margins of society in the march on path of science etc.....

A holistic approach can take towards our aim perhaps faster and better.

Diversity and Science

Equity and Inclusion in STIP-2020.

The policy provides renewed impetus to the mainstreaming of equity and inclusion within the STI ecosystem. An India-centric Equity & Inclusion (E&I) charter will be developed for tackling all forms of discrimination, exclusions and inequalities in STI leading to the development of an **institutional** mechanism. **CSIR Institutes can lead the way!**

Traditional Knowledge System and innovation

An example is application of Aurveda during the times of coronavirus!

Journal Pre-proof

"Standalone Ayurvedic Intervention with Home Quarantine in COVID-19 - Outcomes of Clinical Practice"

Dr. P.L.T. Girija, Dr. Nithya Sivan, Dr. Yamini Agalya Murugavel, Dr. Pallavi Naik, T.M. Mukundan, Dr. Monica Duraikannan

PII: S0975-9476(21)00071-1

DOI: https://doi.org/10.1016/j.jaim.2021.04.015

Reference: JAIM 445

To appear in: *Journal of Ayurveda and Integrative Medicine*

Abstract:

This article reports the treatment outcomes of 167 COVID-19 positive patients who were treated with stand-alone Ayurvedic therapeutic intervention. The main outcomes are quick resolution of symptoms, no deterioration in any of the cases and safe treatment for patients with multiple comorbidities. There was no observed mortality. There were no adverse events due to the Ayurvedic medications. The treatment was undertaken in an out-patient setting and at a low cost.

The efficacy and safety of the treatment, and the quick resolution of symptoms are demonstrated. This shows that if COVID-19 patients are treated with Ayurvedic medicines early in the course of COVID-SARS-2 infection, Ayurveda has the potential to prevent progression and deterioration of the disease, with decreased morbidity and mortality.

Key words:

COVID-19, Ayurveda, Comorbidities, *Vatakaphaja jwara*, Quick resolution, cost-effective

Important to validate traditional knowledge systems and innovate using those which are validated.

What CSIR already has done

Of course CSIR has already contributed enormously to some of these processes thanks to its leaders like Mashelkar and Samir K. Brahmachari!

I speak here of

1) Traditional Knowledge Digital Library (TKDL)

Preserving TK

2)Open Source Drug Discovery (OSDD)

Diversity and Open access to knowledge and information!

What else can be done?

Quite often the keepers of the traditional knowledge especially in the context of medicine, agriculture are the grass root innovators .

Who are these?

Women as well as people outside the mainstream of knowledge systems! Recall the words of Dharampalji

What else can be done?

Important to validate traditional knowledge systems and innovate using those which are validated.

CSIR can help and put in processes to help the grass roots innovators to do the validation.

CSIR can also put in place additional processes to help the grass root innovators to convert the innovations into patents/products and hence economic development

STIP-2020

While drafting the chapter on 'Equity and Inclusion in STI' One of things that was discussed is this last mile connectivity.

Increasing access of the grass root innovators to processes for validation as well as converting innovations into products

CSIR with large number of field stations has the enormous reach to all corners of India which can be an excellent tool!

Entrepreneurship and Women!

Multiple contexts in which considerations of gender aspect is essential!

Women are keepers of traditional knowledge : may it be medicinal practices, agriculture methodology or traditional food!

Many of these can in turn lead to important innovations which can contribute to development
(cf Anil Gupta : Grass Roots innovations)

But there is an important point about gender aspect of Entrepreneurship that gets overlooked!

TK and Women Entrepreneurship!

A wonderful book by Gangaben Yagnik published in 1898

Compilation of about 2080 trades, skills and household tips for self-employment. It includes the information on methods of preparation of traditional medicines; such as for bites, eyes and ears; on Mettalurgy as well as on indigenous cottage industries such as soaps, paper, perfumes, hair oil, artificial pearls, herbal colours, detergent, tooth powder……, (even before Gandhiji)

Training in Science adds to the ways and means women can be entrepreneurs , become financially independent, add to the development of society, increase impact of science

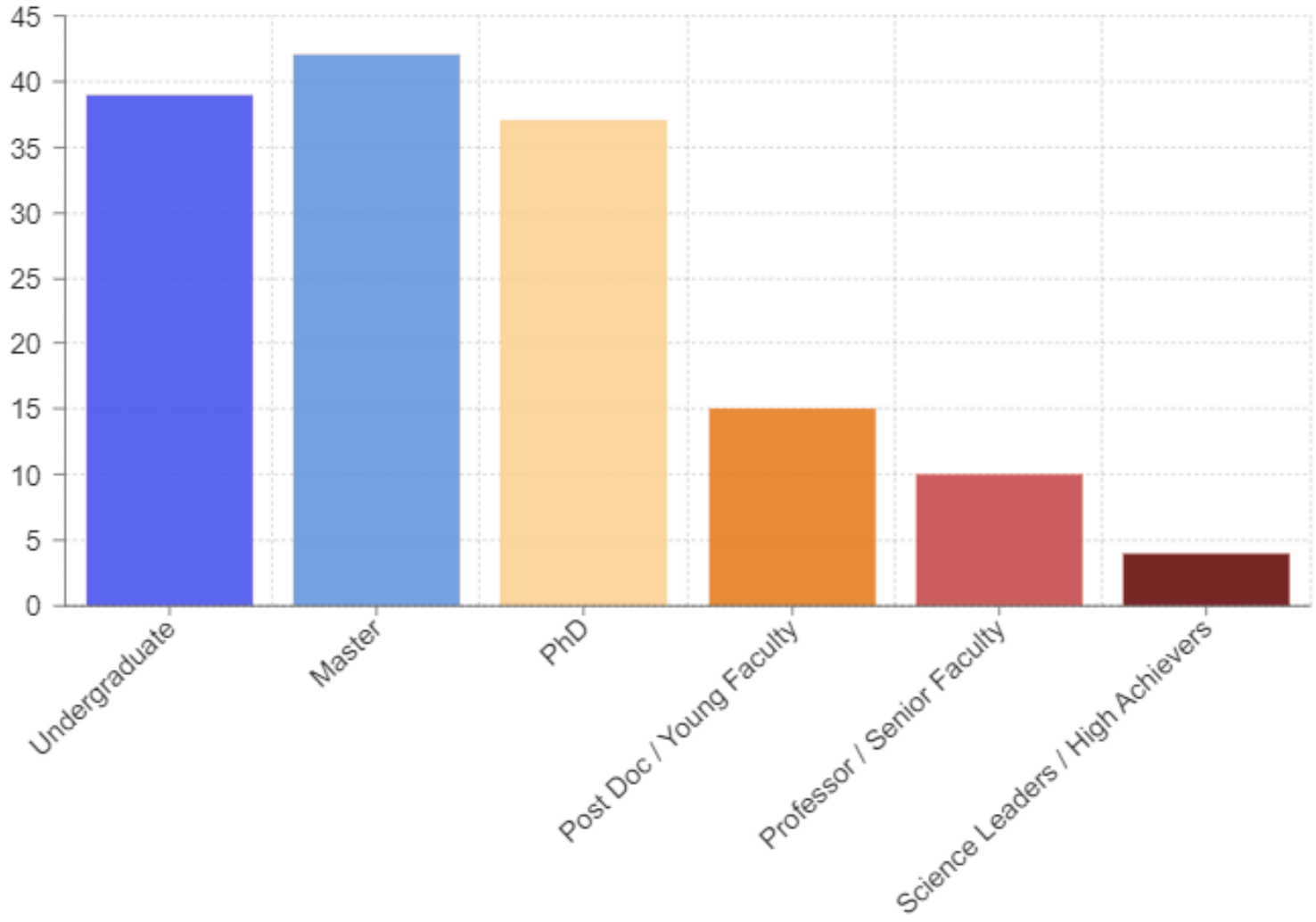
Women in science : India

In India the participation of women in ***studying science*** or for that matter in ***teaching science***, **at all levels**, is NOT LOW AT ALL.

However, number of women ***doing science*** is certainly NOT commensurate with their participation in the other two aspects of scientific activity.

Number of women in science in India is not small but surely the number of women in Indian Science is small

We are always agonising and trying to figure out how to prevent this 'loss' of Indian science!



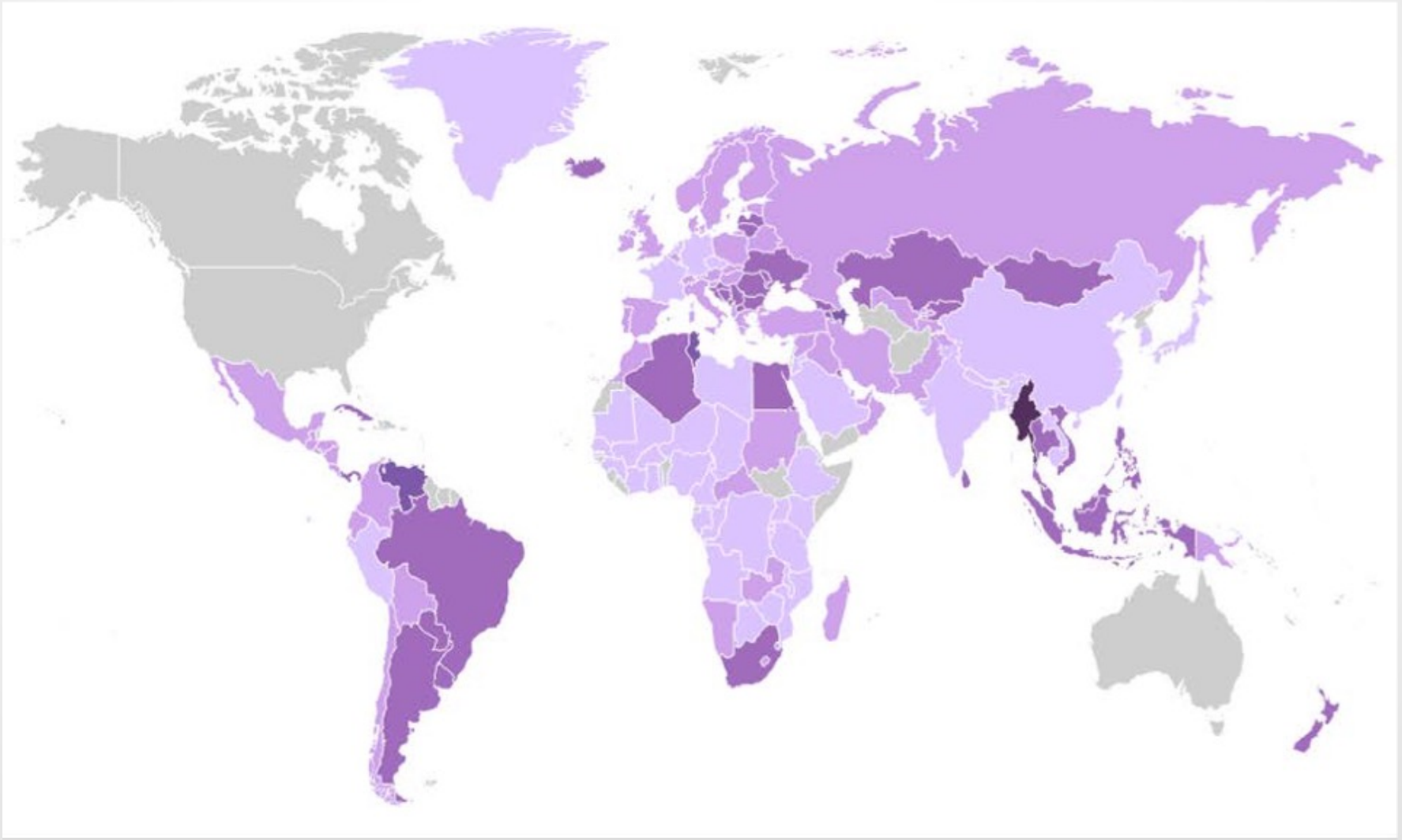
WiS : Indian Story, the big fall!

Real data available.

Unesco Institute of Statistics :

Women in Research: World average at 30%

India at 15% in the upper half of the lowest group.



Plug the drain!

Indian problem: Not just ***development*** of human resource BUT ALSO human resource ***deployment*** ***(for women)*** !

Apart from losing the advantages that diverse work force brings, this is pragmatically **also a** problem of low return on investment.

A country committed on path of innovation based progress can not afford this **'brain drain'! Loss of trained scientific human resource needs to be plugged!**

Obvious cures to obvious problems

Perception:

Sort these problems and all will be well.

- **Policies exist to come back to a career after a break.**
- **Policies for flexi times.**
- **Encourage young girls to choose S&T**
- **Hold training programs for Women Scientists……**

Reality:

It is necessary but not sufficient.

All these directed towards getting women in Faculty and R&D jobs . CSIR is also active in these contexts

Entrepreneurship one more way to plug the drain!

Entrepreneurship for sure provides one extra pathway to avoid the brain drain.

This is one road where flexi times are possible, a break in the career is not as detrimental to future development as in basic science research where the clock of science is ticking continuously

There exist many possibilities of the use of special skills that one acquires during a ph.d.

May it be the expertise in the core subject or tools/techniques required in the niche area or simple things such as understanding of research methodology.

One more way to stop the drain!

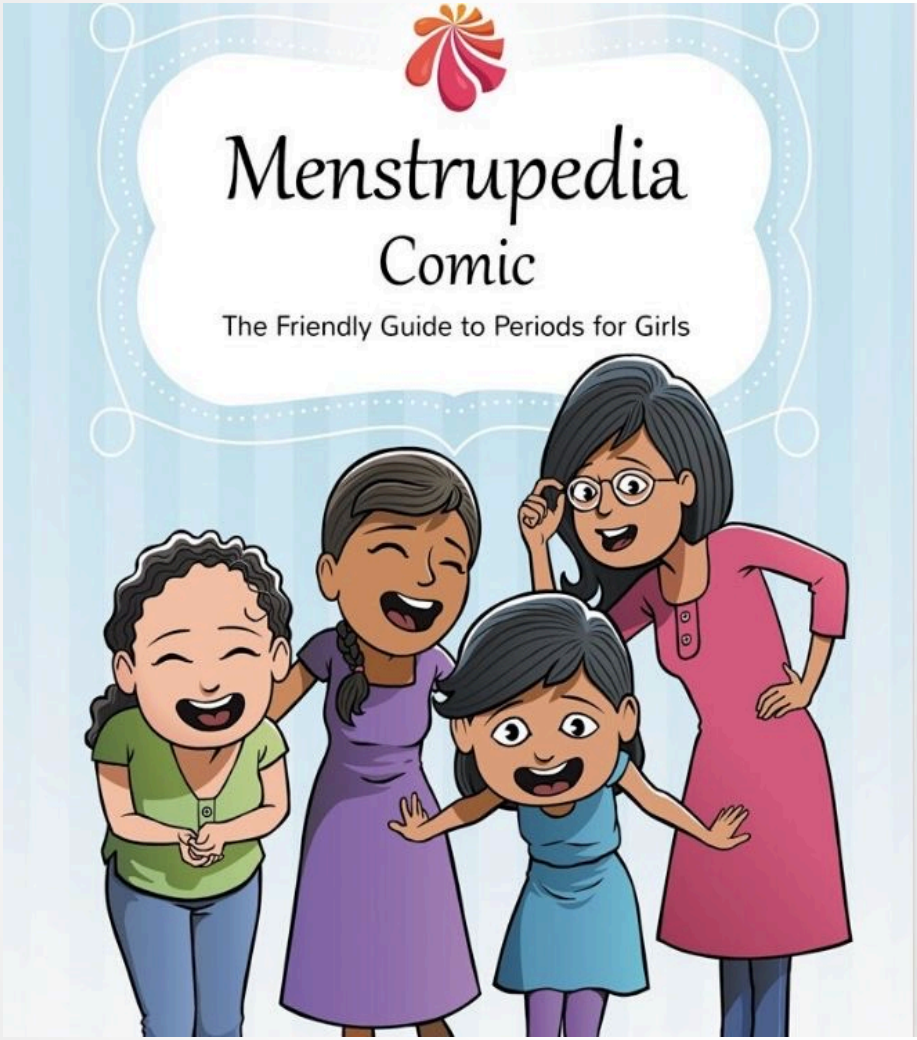
Possibilities are almost endless:

Beginning from scientific communication, offering copy editing services to students/scientists and journals alike to using the core knowledge towards developing drug delivery systems.

Everything goes!
There are examples. A lot of them in area of bio-technology (BIRAC plays a special role)
DST offers skill development programs in science communication, science editing..

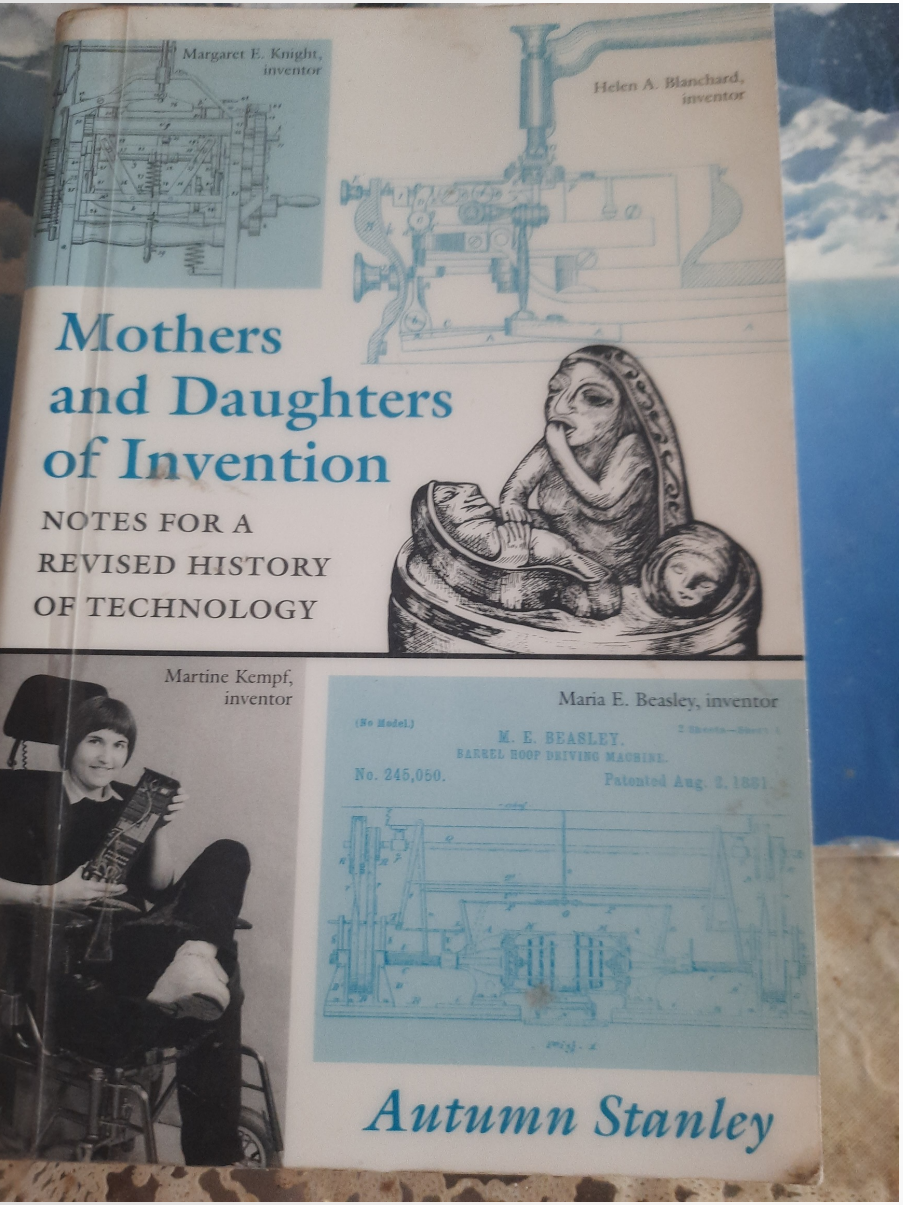
CSIR could also set up special programs to this end!

Aditi Gupta – Founder & Creator of Menstrupedia:



Aditi and Tuhin received **₹50 lakh at 20% equity from Namita Thapar (CEO of Emcure Pharmaceuticals)** for their start-up

Many avenues!



Many paths for women enterpreneurs

1)Agriculture and related technology

2)Medicine and health
(Kiran Mazumdar Shaw)

3)Fertility and antifertility
(our own Indira Hinduja)

4)Tools and Machines (phase contrast microscope: Carline Bleeker)

5)Computers and related technology
(Ada Lovelace) (Suchi Mukherjee)

Current story in enterpreneurship!

According to Forbes India, **over 20% of MSMEs** are owned by **women entrepreneurs** in India which amounts to **23.3% of the labor force.**

The number is rising at a much faster pace with **50% of India's start-up ecosystem** empowered by women in some or another way.

All the major research and teaching institutes are investing in incubation centres..so the possibilities are endless

Indeed will be great of CSIR can also step in here to encourage young women entrepreneurs !

Last word

The journey on the path towards an atmanirbhar, prospering India requires all hands on deck!

CSIR has already processes in place to harness all the sources to achieve its mission.

Being even more inclusive, wrt the knowledge systems, gender and social groups in these processes will make this journey even more successful!

All my best to CSIR towards its vision of NEW CSIR for NEW India in the coming years!