

Caution: Men at Work

Çiğdem Kağıtçıbaşı

The scientific community has too many men and, more often than not, the men who dominate science are old.



MARK LEONG/REDUX/CONTRASTO

In science, as in life, issues related to gender and age might not be that simple and, at times, they are beset by contradictions that might prove surprising and difficult to understand. Limited data, moreover, render any conclusions uncertain. Nevertheless, existing data show that there is tremendous diversity in gender and age balance among regions and cultures across the globe.

Statistics compiled by the United Nations Educational, Scientific and Cultural Organization (UNESCO), for example, shed revealing light on the place of women in the sciences and scholarship. In Latin America, 46% of researchers are women. That far exceeds the world average of 27%. By contrast, only 10% of researchers in India are women compared with an average of 15% in Asia. Yet, women scientists in such central Asian countries as Kyrgyzstan, Kazakhstan and Mongolia enjoy gender parity. That is true in only five European countries — Latvia, Lithuania, Macedonia, Bulgaria and Estonia — all in eastern Europe.

In southeast Asia, women comprise over 40% of the workforce in science. In the Philippines, it is 55%. In Myanmar, women represent 85% of all researchers, the highest proportion of any country in the world. Conversely, the percentage of women researchers in Japan is just 12%, the

lowest in the region and comparable to the rates in Arab states. The relatively low percentage of women scientists in western Europe (27%) stands in sharp contrast to the high percentage in eastern Europe (42%).

These figures indicate that economic well-being, scientific capacity and even lofty political principles do not automatically translate into expanded opportunities for women in science. Other factors are also important, including a nation's educational policies, history and cultural norms.

WOMEN AND WORK

The gender gap, of course, is not new. It existed in ancient times and has persisted in contemporary societies. It is often found in the most prestigious professions.

A study published by R. C. Blitz in the 1970s revealed a similar disparity. It determined that women in scientifically and technologically advanced countries averaged just 5.7% of the workforce in five elite professions (architecture, dentistry, engineering, law and medicine). The figure in middle-income nations and developing countries was 7.25%, rising to 25% in Turkey and the Dominican Republic, the highest in the survey. Admittedly, the statistics used preceded the women's liberation movement in the West,

particularly in the USA. Nevertheless, they are telling, and provide the background for the current global situation.

What accounts for these unexpected findings? Could it be that well-educated women in developing countries have enjoyed slightly better opportunities than their counterparts in developed countries? Rapid urbanization in developing countries has generated an increasing number of positions for well-educated citizens. Moreover, in developing countries such as Turkey, employers might prefer well-educated women living in nearby cities to less-educated men living in distant rural areas and small towns.

At the same time, elite professions and secure government jobs, which have rapidly increased in Turkey and other developing countries, are particularly attractive to middle-class women because of the high income and respectability that they bestow. In traditional societies where women have rarely worked, the distinction between 'appropriate' and 'inappropriate' work for women is often less of a factor. That is true in Turkey and many other developing countries, where it is as common for women to be engineers as teachers. Women in developing countries might, of course, find serious obstacles standing in the way of employment. Yet, once they breach these barriers, they do not

face the prospects of being confined to 'female occupations'.

Put another way, the main distinction in many developing countries has been between 'working' and 'non-working' women. By contrast, social norms in countries like the USA, where women have been a prominent part of the workforce for over 50 years, traditionally defined teaching and nursing (with their emphasis on care-giving) as women's work, and engineering and scientific research (with their emphasis on competition and technical skills) as men's work. That is, at least until recently.

Again, before the women's liberation movement in the USA, researchers such as Matina Horner even detected a 'fear of success' among American women who, when considering careers in 'male' professions, worried that they would be ostracized for succeeding in a man's world. Such psychological sensibilities have never been a critical factor among professional women in Turkey and many other developing countries.

Finally, the persistence of extended families and the greater availability of paid help in middle-class urban households in many developing countries have allowed women to depend on support from other women (such as mothers, sisters, cousins and maids) in pursuing their education and careers. Consequently, husbands have not had to assume what society sees as 'feminine' responsibilities, such as child care. With their traditional male gender roles intact, husbands have tended to be happier with their wives' pursuit of professional careers.

Women's liberation movements, especially in the USA but also in Europe, have helped to expand opportunities for women over the past three decades. Nevertheless, what we see so far is that the number of women in professional positions remains higher in many developing countries than in developed countries. Turkey, for example, has more female full professors (23%) than any other European Union (EU) country. In Germany the figure stands at 4%, in Denmark 6%, in Sweden 7% and in the UK 10%.

Despite the success of professional women, Turkey nevertheless has one of the continent's lowest participation rates of women in the labour force (just 23% compared with 41% in Germany and 40% in France). Women in Turkey also have one of the world's lowest literacy rates (78%), compared with 98% in Europe, according to the UNESCO Institute for Statistics (UIS).

Educated urban women in Turkey and in many other developing countries represent a privileged class. This points to one more gap: a female-to-female gap that is driven by distinctions in social class and urban versus rural lifestyles.

Statistics, in fact, show that in developing countries, this 'in-gender' gap might be more prominent than the 'between-gender' gap. Whether this will continue remains an open question. Recent studies suggest the westernization of urban societies in developing countries is generating the sort of gender distinctions seen in

developed countries. In academia, for example, women are increasingly pursuing degrees in the arts, education and humanities, instead of engineering and the sciences.

On a global scale, only slightly more than one-quarter of the world's researchers are women. Two other characteristics mark the status of women in research worldwide. The first is that women are more likely than men to be employed in the public sector than in the private sector. The second is that women are less likely to hold administrative positions.

On the positive side, because some women are less burdened by administrative duties, they can devote more time and effort to teaching and research. On the negative side, of course, lies the question of power and influence. Women do not have much say in issues related to policies, budgeting, management and promotions.

Such workforce limitations, of course, are a global phenomenon and are not restricted to the developing world. Again, this might be driven by different factors, including a preference to devote more time to family and children, and a desire to focus on teaching and research instead of administration and management. Then again, the 'power gap' might be driven by gender bias. Whatever the causes, the result is that less power is in the hands of women.

For the first time in the history of the USA, women now serve as presidents in one-half of the Ivy League universities, including Harvard,

and in a quarter of all colleges and universities, according to the American Council on Education. Yet, women in the USA still hold fewer than 20% of all full university professorships. Likewise, in many developing countries, women remain in the lowest academic positions and rarely become administrators, let alone presidents. That is particularly true in Africa and in the Arab region, although recently women have begun to enter mid-range management positions, mostly as deans and department chairpersons.

MIND YOUR AGE

Just like the gender gap, the age gap in the sciences and among researchers is a global concern that defies broad generalizations.

When it comes to science and academia, age truly does matter. The issue is this: how can age distribution be managed to provide opportunities for young researchers without undervaluing the benefits derived from the experience, knowledge and wisdom of older researchers and faculty?

If too many older scientists and scholars stand in the way of the younger generation's advancement, university students are likely to seek more lucrative fields in business, medicine and law. Personal goals for advancement must remain within reach if students are to pursue demanding and time-consuming careers in scientific and scholarly fields.

Yet, it also takes a great deal of time, effort and sacrifice to achieve distinction as



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a researcher or academic, and it would be unfortunate to see well-trained older individuals leave their positions while they remain enthusiastic and productive. Encouraging universities and research institutes to make full use of the human resources that are available benefits both science and society. That is especially true in developing countries, where intellectual resources are in short supply yet in high demand.

Statistics on age distribution in the scientific community are even more limited than those on gender distribution, and data are particularly sparse in the developing world.

GENERATION NEXT

As part of a larger demographic trend, the developing world is facing a future marked by ageing researchers and faculty. Improvements in medical care, combined with laws prohibiting mandatory retirement, have led a growing number of researchers and academics to continue working well beyond their sixties or even seventies. Statistics show that there was a threefold increase in the number of faculty over 70 years of age in US universities between 1995 and 2000. As Lawrence Summers, former president of Harvard University, has noted: "It defies belief that the best way to advance creative thought, to educate the young, or to choose the next generation of faculty members is to have a tenured faculty with more people over 70 than under 40".

In India, by way of contrast, faculty must retire by the age of 60 years. As a result, the 'greying' of academia is not as much an issue there as it is in developed countries. India's slow promotion system, which at times is based more on personal contacts than merit, elicits much more concern and many more complaints.

While systems of promotion vary across the developing world, many still follow outdated methods of assessment drawn from the colonial period. However, many countries in the developing world have undergone a rapid expansion in higher education that has required them to hire a large number of young professors. In China, for example, 30% of the faculty are in their twenties and thirties, while only 3% are older than 60 years. There is, however, a 'faculty void' between the ages of 45 and 50 years, largely due to the assault on science and other intellectual pursuits that took place during the Cultural Revolution.

In 1990, an estimated 68 million students were attending universities worldwide. In 2004, the world's student population had nearly doubled to 132 million, and by 2025 it is projected to reach 150 million. Most of this growth is taking place in developing countries.

More students, of course, means more faculty will be needed. Yet, universities and publicly funded research institutes are not the only places where scientists and scholars can be found. There is also a rising number of research and development centres in the private sector, eagerly seeking to hire young graduates with good analytical skills. This is true in both the developed and the developing world.

In short, age is an issue in science and academia across the globe. But the developing world's youthful population, combined with the unprecedented growth of universities and research centres, could mean that young scientists and academics will enjoy greater opportunities for advancement than their counterparts in the developed world. That will be true, however, only if procedures for hiring

and advancement become less cumbersome and easier to implement. The young will be present in the developing world in large numbers, but whether they will be well-served will depend as much on administrative reforms as on demographics.

WHERE TO NOW?

As the discussion above indicates, issues related to gender and age are complex and multifaceted. Perceptions might differ from reality, and solutions might be less evident than they first appear.

This is particularly true in the case of gender distribution, where historical and societal forces have moulded cultural values that are not easily altered.

Attaining full gender equality, whether in science, academia or other sectors of society, will require a profound transformation in cultural values that will take generations to achieve. While waiting for a cultural revolution that might never arrive, nations could embark on specific reform measures to mitigate the problems inherent in the gender and age gaps. The measures that they might want to consider include educational programmes to increase awareness of the importance of gender equity both as a moral and economic issue. It could also mean enacting policies that encourage women to pursue education and employment in fields of science and scholarship.

Developing countries have a great deal to gain from the full participation of women in the knowledge economy. It is encouraging to note that many developing countries enjoy a head start in their efforts to advance this goal, largely due to the comparatively high percentage of professional women found in elite, high-paying fields. The challenges today lie in increasing opportunities for poorer, less-educated women in cities, small villages and rural areas, and in breaking through the 'glass ceiling' so that more women will hold management and leadership positions.

As for age imbalances, innovative policies must be devised to protect experienced knowledge workers without discouraging the next generation of students from entering science and other fields. For example, older professors could be allowed to remain on the faculty without remuneration and without administrative responsibilities — allowing them to pursue their own research agendas freely and to teach classes. This would allow older faculty to remain active and involved without blocking the career paths of younger researchers. It would also encourage an intergenerational exchange of ideas and research collaborations between young and old. It does, of course, depend on having reasonable pension systems in place, and a willingness to approve and enforce mandatory rules for retirement.

Achieving gender equality and constructing a balanced age profile in the developing world

VIEWPOINT | Zohra Ben Lakhdar-Akrout

More than good enough to do world-class research

When I returned to Tunisia from France in the late 1970s, my country's scientific capacity was low. Scant government investment in science and technology reflected that reality. The laboratory where I worked had no equipment and a staff of one. Today, my laboratory is staffed by 50 scientists and equipped with two lasers: a diode laser that arrived in 1995, with financial help from the European Union; and a nanosecond pulsed laser, which was paid for by the Tunisian government and began operation in 2003. We might not have a faster, more powerful (and, I might add, more expensive) femtosecond pulsed laser, often found in laboratories in developed countries. Yet, our equipment is good enough as it is to do world-class research. The laboratory has an annual budget of around US\$100,000. That is by no means lavish. But it allows us to buy equipment, fund graduate students, have our researchers participate in international workshops and have other scientists visit our laboratories. In the 1980s, funds were so meagre that I had to focus on theoretical studies of the interaction of atoms and molecules. There was no way I could afford to do experimental research. Research was so difficult that it took me 10 years to publish my first paper. Today, thankfully, there is growing awareness among the nation's political leaders that science is a key to development and a fundamental prerequisite for growth.



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