

Commentary

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Gender - an essential substance for sustainable chemistry

Introduction

In July last year we, the *MSP Institute – Multi-Stakeholder Processes for Sustainable Development*, invited various stakeholders to discuss how to shape chemicals management in Germany in a gender-responsive way and were surprised by the interest of many industry stakeholders, especially small and medium sized enterprises, in the topic. Ranging from large chemical companies celebrating pride month to quite specific discussions on gender-sensitive language in chemistry journals, the chemical sector seems to be searching for its own interconnections to gender and how to deal with them. To support this development, this commentary provides an overview of the gender dimensions and inequalities in chemistry and offers initial ideas for the implementation of gender mainstreaming as an integral part of management for sustainable chemistry and beyond.

Gender Dimension in Chemistry

The interconnections between gender and chemicals are complex and multi-dimensional. In summary, the following key dimensions justify serious consideration of gender within the world of chemistry (see Hemmati and Bach, 2017):

- a. Biological dimension: Women's and men's bodies are affected differently by certain chemicals – risk and impacts can be different between the sexes. Women, for example, tend to store more environmental pollutants in their body tissues than men due to a higher body fat content. In addition to puberty, women live through other phases of life such as pregnancy, breastfeeding and menopause, during which their bodies become more susceptible to health damages from chemicals due to the significant physiological changes. Furthermore, chemical exposure can also be passed on to the next generation (UNDP, 2011; IPEN and SAICM, 2020). Consequently, non-
- b. Social dimension: Gender is also linked to gender-specific norms of behaviour, roles in society as well as the development of 'feminine' and 'masculine' identities, which in turn influence people's behaviour, including their impact on the environment, the levels to which they are affected by their access to and power over resources: Due to the division of labour between the sexes, men and women are often affected by different chemicals. For example, men are more likely to work in construction and thus come into contact with chemicals from building materials, while women are more likely to work in the care sector with cleaning agents and cosmetics or care products. Additionally, the division of labour also causes differences in exposure within individual sectors: For example, women in agricultural are more affected by indirect exposure, e.g. from harvesting and handling chemically-treated plants or contaminated clothing, while men are often more directly exposed, e.g. when mixing chemicals. Women are also more severely affected by indoor pollution, e.g. from the burning of household fuels or chemical pollution from furniture, especially in poor population groups (UNDP, 2011; ILO, 2021).
- c. Transformative dimension: However, the gender perspective enables us to understand and unpack root causes of unsustainable behaviour, and helps us to find new solutions for sustainable chemistry. Gender

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analysis can be used, for example, to find out why protective measures are repeatedly disregarded when dealing with toxic chemicals: Women, especially those from developing countries, are less likely to be able to afford appropriately-fitting protective clothing than their male colleagues (if it is available at all) (OWD, 2006). Men, on the other hand, often believe that wearing protective clothing is unnecessary and indicates a level of weakness, and tend to use risky behaviour and dangerous practices in order to improve their status in a group (Andrade-Rivas and Rother, 2015).

Gender Inequalities in Chemistry

Even though these gender dimensions cause inequalities that have negative impacts on human health and the environment and a gender perspective might reveal better solutions, specific and widespread knowledge on gendered ways of exposure and differentiated and long-term effects of chemicals on women and men as well as comprehensive consideration of gender in the chemicals management is still lacking in politics, sciences and industry. Consequently, the chemistry sector is mostly gender blind (see also MSP Institute, 2021):

For example, in chemical science and product development, there are huge research gaps on gender and its interlinkages in toxicology and risk assessments. Biological differences do not find sufficient consideration, the white male body still being used as the general prototype (IPEN and SAICM, 2020).

The field of occupational safety and health is strongly marked by social gender differences. Men tend to work in high-risk industries and suffer from more short-term but acute exposure with significant health or even fatal consequences. On the contrary, typical "women's jobs" mean more indirect and long-term exposure, which is presumed to be less hazardous and often receives less attention in terms of protection measures. Consequently, women's occupational diseases are under-diagnosed, under-reported and under-compensated (ILO, 2021).

In chemicals management, women are underrepresented at all levels of political and industry leadership. Women's concerns, capacities and capacity gaps, as well as proposals are often overlooked in project design and

implementation activities. The same applies to innovations and opportunities for being agents of change: women's specific experiences, expertise and feminist perspectives are often not acknowledged, structural barriers and less funding for women's businesses and start-ups continue to be the norm, and due to the masculine image of chemistry, women and girls still face discrimination in the discipline (Royal Society of Chemistry, 2018; ISC₃, 2020).

Gender and Sustainable Chemistry

In order to use chemistry as an important driver towards sustainable development, holistic approaches are needed, which consider the economic, environmental and social dimensions of sustainability, including gender (ISC₃, 2021; Hemmati and Bach, 2017). One essential aspect of strengthening decision-making and actions related to chemicals is gender mainstreaming. Gender mainstreaming is the internationally agreed strategy for implementing Sustainable Development Goal (SDG) 5: gender equality (UN Women, 2020). Additionally, gender mainstreaming is a cross-cutting task for the whole of society, and hence reflected in several other SDGs in the 2030 Agenda for Sustainable Development (UN Women, 2018), a fact that underlines further that we need sustainable chemistry and gender mainstreaming in order to achieve sustainable development. Furthermore, due to the aforementioned interconnections of gender and chemicals, we conclude that there is no sustainable chemistry without gender equality and no gender equality without sustainable chemistry.

But what would a gender-just and sustainable chemistry look like? Three criteria seem important:

1. no gender suffers from toxic chemicals nor from structural inequalities in chemicals production, chemicals use, or chemicals policy;
2. all gender are seen as agents of change and can take leadership roles in the chemistry sector; and
3. all gender benefit equally from sustainable chemistry.

Gender and Sustainability Management

How can industry realize such a vision of a gender-just and sustainable chemistry?

Gender experts differentiate between various forms of gender integration into project management: 1) individual gender-activities, mostly with a focus on empowering women and girls; 2) gender-sensitive project management that takes gender roles and the diverse needs of all gender into account so that projects contribute to gender equality in their respective project thematic contexts; and 3) gender-responsive project management by which the project aims to change structures of gender inequality in our societies and to transform gender relations.

This differentiation is similar to the differentiation of sustainability management: 1) Corporate Citizenship stands for individual, additive and external measures mainly with the focus on a single issue; 2) Corporate Social Responsibility describes internal and external measures accompanying the core business and focusing primary on transparent communication and social benefits for employees; and 3)

Corporate Sustainability includes the sustainable design of the core business, a rethinking of the business strategy and contribution to structural changes in economy and society (Schaltegger, 2011).

By combining both approaches we can identify strategies for integrating gender in sustainably management (see figure 1): 1) individual gender activities can be described as a part of Corporate Citizenship and focus mostly on external actions for the empowerment of women and girls independent from core business, e.g. the sponsoring of a women's charity run; 2) gender-sensitive management can be part of the Corporate Social Responsibility approach and describes internal and external measures regarding gender with a focus on human resources development and gender-sensitive communication, e.g. the use of gender-sensitive language and women's quota for leadership positions and a considerate handling of the dilemma of health protection and employability of pregnant and breast-feeding women; and 3) gender-responsive management might be part of Corporate Sustainability and describes the approach of

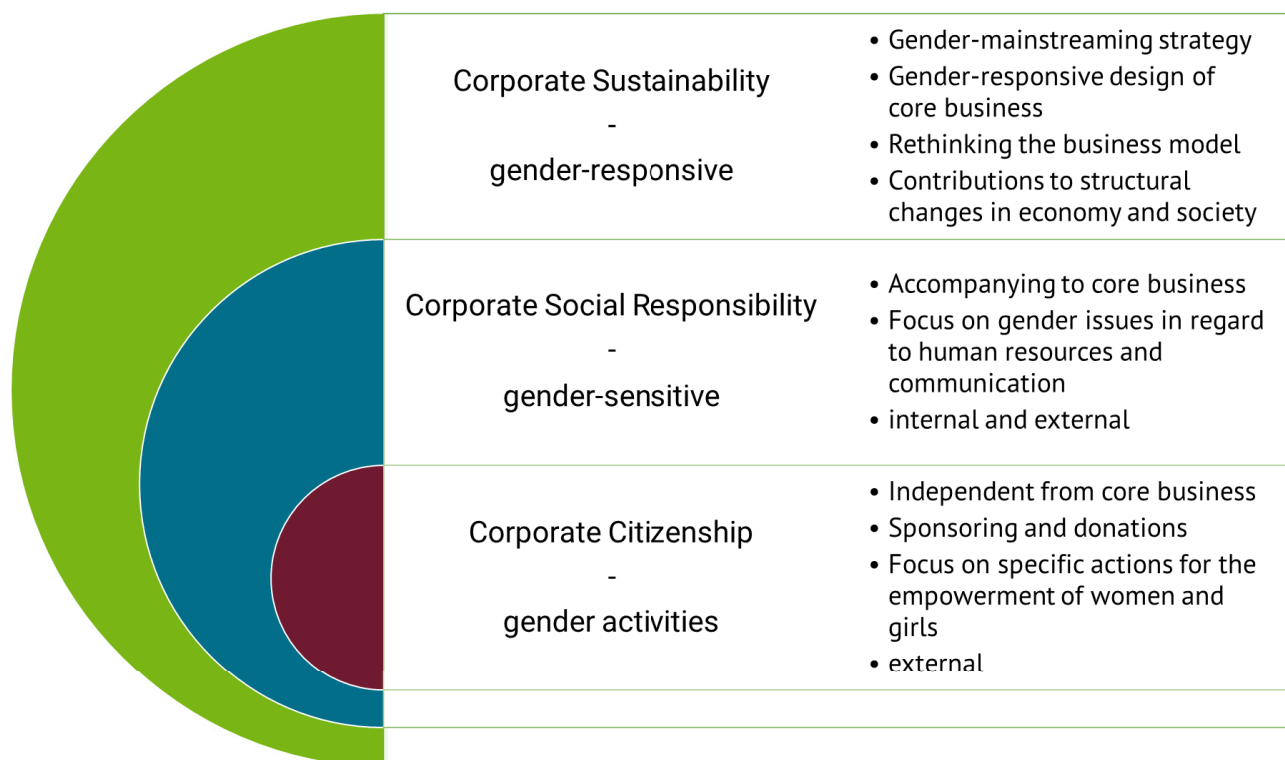


Figure 1: The Integration of Gender and Sustainability Management Approaches (own representation based on Schaltegger, 2011).

developing a gender-mainstreaming strategy that includes the gender-responsive design of the core business as well as contributions to structural changes in economy and society for gender equality, e.g. the collecting and open access publishing of gender-disaggregated health data for the support of gender medicine.

Gender-responsive Management for Sustainable Chemistry

The Corporate Citizenship approach and gender activities independent from core business are not used widely (anymore) in the chemicals industry as they might pose a reputational risk for the chemicals industry. In fact, the term “pinkwashing” originates from criticism against US cosmetic and pharmaceutical companies that advertised their products with pink ribbons, the symbol of commitment against breast cancer, even though others among their products were suspected of causing cancer (Selleck, 2010). Instead, the approach of gender-sensitive management and Corporate Social Responsibility seems to be used more widely: chemical companies set themselves higher targets for the proportion of women in leadership positions, support flexible working conditions and internal LGBTQI+ staff networks or use gender-sensitive language and the hashtag #chemequality.

In our view, these are initial, and promising steps towards gender equality, but they are not enough: a recent study on equal opportunities for women and men by the Association of Executives in the German Chemical Industry (VAA) shows that only 44 per cent of all respondents experience equal opportunities as part of their company's philosophy, and there are significantly different gender perspectives: only 28 per cent of the women stated this, compared to 51 per cent of the men (VAA, 2020). In addition, the issue of gender equality is increasingly important for young professionals (e.g. the *jungchemikerforum* in Germany was hosting a series of online diversity talks focussing among others on women in chemistry and LGBTQ* support & gender consulting in Nov 2021) and, as part of social sustainability, the issue could become more important as a selection criterion when choosing an employer.

Therefore, gender-responsive management seems essential and promising for sustainable chemistry, but what might that look like? From our perspective, **gender-responsive management for sustainable chemistry** means that the

three key criteria of a gender-just and sustainable chemistry mentioned above are mainstreamed into all of the company structures and processes, taking into account all internal and external stakeholders: employees, the planet and society as well as customers, owners and partners (see figure 2):

For employees, gender-responsive management might mean that there is gender-balance in the workforce, flexible working arrangements and transparent and equal pay. Additionally, regular gender and diversity training are offered, the company has strict non-discrimination policies and strives for a gender-sensitive communication culture and gender-sensitive occupation safety measures.

Gender-responsive management for sustainable chemistry might also contribute to the health of our planet and society with strong company commitments to human rights, gender equality and diversity, the use of gender-sensitive language in external communication and no use of gender stereotypes. The support of women in STEM and legal frameworks, policy processes and initiatives for sustainability and equality might be additional contributions to structural changes in economy and society.

As said before, gender considerations regarding employees and/or the planet or society are already in the focus of gender-sensitive management. Gender-responsive management would go beyond that and also consider gender issues regarding costumers, owners and partners:

For costumers, gender-responsive management might mean that a company uses gender-sensitive marketing strategies, is aware of and responding to gender-differences in consumer behaviour and product use as well as gender differences in potential health impacts of the products, and collects and publishes gender-disaggregated consumer and health data.

For business owners and partners, gender-responsive management for sustainable chemistry might mean that ownership and profit is gender-balanced, investments in sustainability and gender mainstreaming strategies are the norm, and that human rights and gender equality are being standardized in the supply chain.

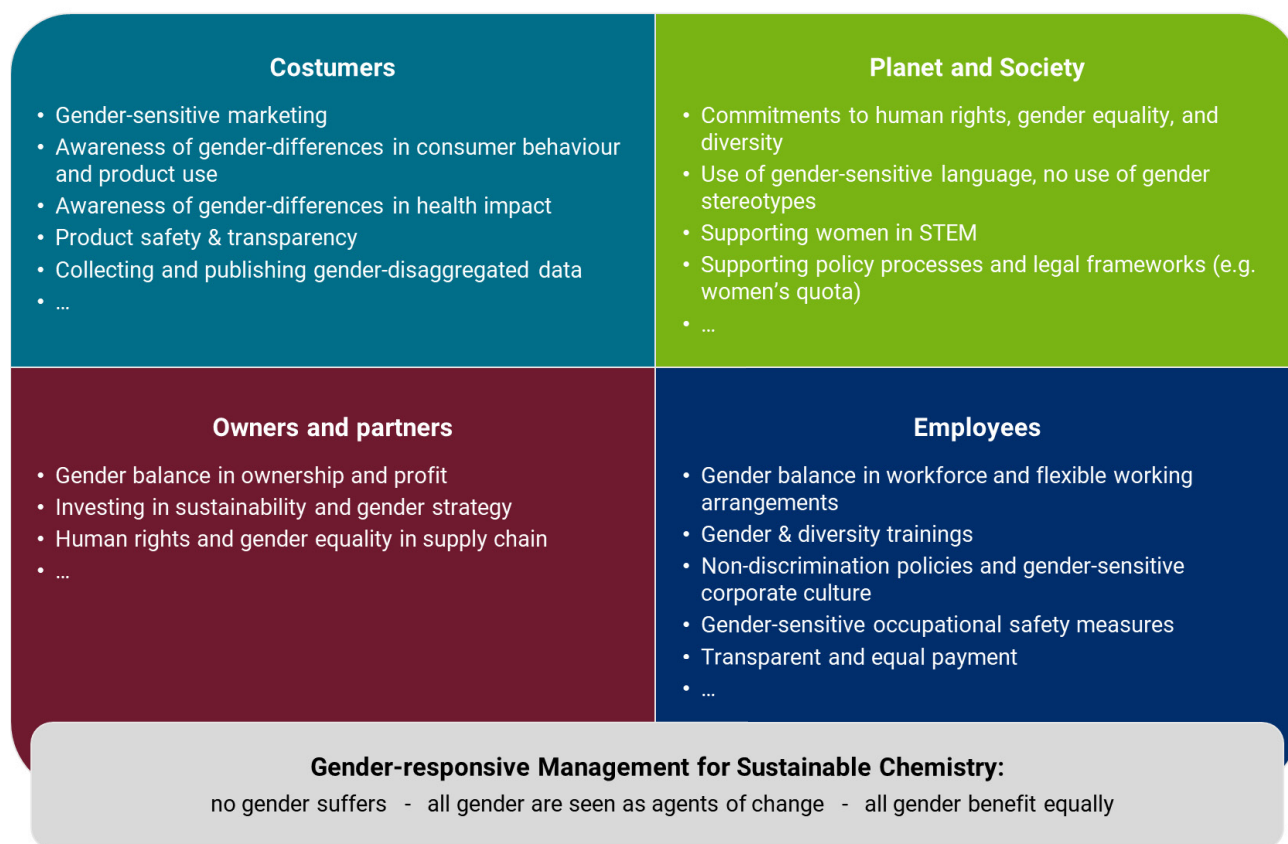


Figure 2: The Integration of Gender and Sustainability Management Approaches (own representation based on Schaltegger, 2011).

Conclusion

Gender inequalities are omnipresent in our societies, and their complex multidimensionality also permeates the world of chemistry, e.g. in occupational safety, academic career paths and consumption choices. Negative but often avoidable effects of chemicals on human health and the environment are the result. The chemical industry should step up its efforts, take more responsibility and contribute to the necessary transformation towards sustainable development in whatever way it can. The implementation of gender-responsive management as an integral part of sustainability management is essential for sustainable chemistry and offers a promising path for the chemical sector, especially for small and medium-sized companies, to deal with its interconnection to gender issues, to sell good products and to contribute to a healthy planet and society.

With this commentary, we hope to stimulate further research and discussions on gender within the chemical industry and would welcome exchange with interested readers.

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