

Towards an egalitarian model of socio-economic and technological development

Gender Mainstreaming as a strategy of transition to a more resilient society

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1. A democratic deficit

Today, the link between technology and human progress is a common topic of public debate. The growing awareness that technical possibilities do not necessarily contribute to human development, is a huge blow to our assumed progress. Technology increases control over human lives, but can also be used for systematic genocide. Technologies that were created for peaceful purposes – such as nuclear power stations, cars or pesticides – today present risks for the survival of mankind and nature. The apparently unrestrained technological development is increasingly seen as a democratic deficit, as a process over which citizens no longer have any control. The call for a public debate about the direction, speed and impact of technological developments is heard with increasing insistence. But the gap between specialists and citizens has become so deep and the complexity of the subject so immense that there is a real risk of a black and white debate, polarised between ‘believers’ who put all their hopes into new technological discoveries and ‘sceptics’ who see them as the source of all evil.

In this essay we take a look at the relationship between gender and technology set against this background. The gender debate itself is often fed by a sense of democratic deficit (Snick & De Munter 1999). The unequal balance of involvement of different groups of men and women in the world of technological development, for instance, is seen by many as a form of exclusion or injustice. The central focus of this essay is that the unequal position of men and women (which we will refer to here in short as the gender debate) and the lack of democratic control over new technologies have their roots in the same underlying mechanisms; these mechanisms have their origins in the epistemology (a set of assumptions about science) that has become dominant in the West and consolidated in academic and technological institutes and practices. Moreover, important financial interests are involved, which in turn lead to financial high-tech and specialised regulations governing intellectual property rights that may block the democratisation of knowledge (Van Overwalle, 2009).

1.1. The digital divide

Information and communication technologies (ICT) are omnipresent. Service providers and government bodies are increasingly turning to electronic transactions with their clients or citizens; schools communicate with students via online platforms, information is more widely available on the internet than in hard-copy printed format. This probably is advantageous for the environment, but for people who have no access to ICT for one reason or another, it represents a source of exclusion.

We may ask: what does this mean, having no access? And what does that have to do with gender? Studies have revealed that women make less use of the internet than men, even if they have access to the same number of computers and internet connections. Power relationships within families play a role in this: women are less likely to take a dominant position when it comes to using the computer, while men and teenagers like to be considered as the authority in matters relating to ICT.

The digital divide appears even deeper when, in addition to sex, we also look at level of education, family income, employment and the number of social networks to which people have access. When one realises that women are much more likely to be heading a single parent family and live under the poverty line, it also becomes clear that they run a greater risk of being pushed to the margins of the digital society. The Belgian and Flemish governments have made a great deal of effort to combat the digital divide, in the first place by making computers and internet connections available within families (first-degree combat). When this did not appear to lead to equal use of computers by all social groups, the government invested in strengthening computer skills and levels of motivation among individuals (second-degree approach). However, even this approach does not give all social groups equal access to ICT uses either. Therefore, a “third-degree” strategy against the digital divide requires a more in-depth analysis, which is what we will present in this essay.

1.2. A glass cage

Women are under-represented in domains where technologies are designed, developed or managed. Fewer girls choose engineering studies, or else they leave this field of specialisation after completing their studies. Fewer women with technical qualifications reach top jobs in research, development or production. Women employed in jobs in the technology sector are surrounded by glass walls and ceilings. Thus they have less control over the way technologies are developed or distributed. Needless to say that women who have lower educational qualifications have even less control over these phenomena.

Moreover, technology has an increasing impact on the lives of women, and this too is creating an invisible glass cage. If medical technology allows couples to plan their pregnancies, this can also increase the pressure on people to postpone the establishment of a family. Women who postpone their careers in order to start a family have difficulty catching up later. This implies that they generally receive a lower income, are disadvantaged in terms of social security and, after a divorce, run an even greater risk of falling below the poverty line. The socio-economic system punishes women who have their children young. If later in life they struggle with fertility problems, medical technology is ready to help them with artificial fertilisation techniques, so the excuse of the biologically optimal age loses its power. This gives rise to the view that women who have children at a young (optimal) age, actually ‘punish themselves’ with reduced career opportunities later in life. Women are exhorted by the socio-economic system and social legislation not to make the ‘healthier’ choice, but – relying on medical technology – to comply with prevailing economic rules. Let’s not forget that medical technology is now big business and remains profitable as long as unhealthy lifestyles are perpetuated (Lietaer 2011).

Part of the women’s movement does not question these socio-economic rules, but appeals to women to play the game; they exhort them not to be lured into care work. Since without care society cannot reproduce itself, care work is being encapsulated within the economy via crèches or residential nursing centres. Care is only considered real work when it is provided against

payment, so commercialising it is also increasing employment. However, this does not solve the gender problem, but merely shifts it towards the more vulnerable groups.

A competitive economic system valorises productive work more than work in the care sector; if you produce a computer, you earn more than someone who raises children. Women often choose professions in the care sector or prefer part-time careers, while men more often opt for full-time careers and jobs in technology. Women with higher education who follow the male example, will leave their care work to women with lower qualifications. The power struggle between the sexes thus shifts towards an inequality between women.

1.3. Trees without a forest

By financing research, governments promote the development of ever new technologies. Their main concern is to remain up front in the international competition. Bio-, nano-, cogno-technologies are just a few of the recent branches that have grown onto the technology tree. These types of technologies are often applied before their social disadvantages – such as the risk to health and the environment, for instance – have been thoroughly ascertained. Nano-technology is used in cosmetics and food packaging, without any thorough research being carried out into the dangers for human beings and in particular fetuses (Klein 2011).

Of course, it doesn't help that specialists who produce cosmetics or food packaging know nothing about wombs and fetuses. The scientific model in which progress goes hand in hand with increasing specialisation, is at the base of this deficit. At the top stands the lonely specialist who works on the smallest possible particle of reality, at the tiniest possible scale. High technology today concerns nano or quantum particles, genes, DNA, microbes, microchips or splitting atoms. By focusing on this micro level, scientists and technologists lose sight of the impact of their creations on the macro level, on people as a complex organism, on broader society and quality of life for future generations (Ulanowicz 2009).

2. The dominant scientific paradigm

The classic answer to the gender divide we have outlined is to guide more women towards technology. Role models, better study choices and mentoring is supposed to help women over the threshold. Organisations and research institutions are asked to break down glass ceilings and create conditions that take into account the care work carried out by – well, yes – women. In order to reduce the digital gap, cheap internet connections are distributed, easily accessible ICT-courses and awareness raising campaigns are set up. To put it bluntly, the gender gap is explained by the 'wrong' choices made by women (the micro level) and the cultural and structural mechanisms (meso level) that encourage them to make these choices. Science and technology as a societal goal embedded in a competitive sector and booming business (macro level) are presented as inherently valuable. If only women would agree to participate to the same degree as men, there would be no democratic deficit... would there?

2.1. The HE-scenario

Studies concerning the entry of women into the world of technology, reduce women to the position of the object of research. Using all types of variables that researchers deem relevant, women are categorised, and statistical analyses then shows which factors make them susceptible to being excluded from the delights of technology. Technology is a fast-moving train that is escaping democratic control. Social scientists who want women to join this fast moving train, put themselves at the service of the ideal of progress, by penetrating ever deeper the ambitions, study choices and habits of women. The democratic deficit is not seen as a reason to question the normative vision of technology, but only to investigate how practices of women, families and schools can be better adjusted and streamlined to fit the ideal of progress. To put it sharply, technology is being presented with increasing emphasis as the only possible choice, and - in the name of democracy, freedom and autonomy - women's freedom of choice is being curtailed. In all of this, the economic argument – the competitive position of society and its citizens in the overriding economic system – is the decisive factor.

Today it is not obvious for intellectuals to call this type of injustice into question (Hellemans 2007). Social and biomedical sciences seem to want to emulate the ideal of physical sciences (Ulanowicz 1997: 151). Therefore, the targeted improvement should be quantifiable. People who use 'more' technology, are perceived as behaving 'better'. Consequently, streamlining citizens in this normative model inevitably entails hierarchy: those who are more adept at technology are 'higher' up the ladder than the cleaning lady who is afraid of pushing any of the buttons, or the seniors who prefer to ignore the e-helpdesk. Research into hormones and brain development are theorised in order to explain the fact that women 'lag behind' when it comes to technology. Specialised techniques are designed for remedying those children who have problems with the race to the top of the scientific ladder, ranging from remedial education to medication (Verhaeghe 2009). This exclusive path to progress is possible via an increasingly deep penetration of science and technology in the social fabric, a scenario that Robertson (2008: 20) calls the Hyper-Expansionist or HE scenario. If you only have a hammer, all you see is nails. As long as only one scientific model rules, there is no other option than to apply the same tactic in order to improve the world. So science and technology end up modelling society according to their own ideal. If this looks like leading to a lack of equality among the genders, then the only conclusion is that the hammer needs to be perfected and women need to be nailed down better. But how do you break this vicious circle in which competitive technology is achieved at the expense of a growing democratic deficit?

2.2. The human world as a mega-machine

The scientific ideal that forms the foundation of technological developments first saw the light of day in the 17th century. The anti-clerical mood of the time resulted in scientists and philosophers laying the emphasis on the material dimension of reality, and rejecting any form of liaison with other spheres of life as non-scientific. There was an increased focus on the similarity between

natural processes and mechanical processes, and it was Newton who convinced the scientific world that material and mechanical aspects formed the most important foundations for providing explanations about natural phenomena (Ulanowicz 1997: 13-16). The framework for 'valid' scientific explanations was limited to characteristics and interactions of organisms (at a micro level) that could be mathematically expressed as natural laws. It was (and is) assumed that the same mechanisms apply to a greater whole, that people, economies, societies and eco-systems are mega-mechanisms operating according to 'natural' laws.

Newton's worldview became a paradigm, an ensemble of conventions that define scientifically legitimate methods and research agenda and that are sustained by several academic control mechanisms. In other words, in defining what is scientifically 'true', power relationships are inevitable (Kuhn 1996). This sheds a new light on the aforementioned democratic deficit. Science is to a certain degree impossible without the exercise of power; it needs binding agreements and rules in order to achieve progress, and uses scientific discipline mechanisms keeping scientists within the paradigm. Nobody doubts the fact that stunning technological results have been achieved on the basis of the Newtonian paradigm. However, the fact that these results do not have a beneficial impact on everyone, also raises a plethora of questions. The question is mainly whether this deficit can be solved by 'more of the same paradigm' – an HE scenario.

Does the paradigm leave room for innovative, out-of-the-box approaches to new social problems? We have reason to believe that scientific regulations can hinder the development of knowledge for a sustainable society. One example highlights this. In February 2011, an international conference took place in Lyon on 'Community and Complementary Currencies', an initiative aiming at unifying the forces of the academic world and social organisations against the dominant monetary system. Backed up by economic theories, the monetary system takes risks that lead to financial and other crises, for which tax-payers bear the consequences. The answer to this democratic need consists in breaking the monopoly of bank money, which can be done by introducing complementary exchange systems. When the question arose which intellectual infrastructure the worldwide movement for complementary currencies has at its disposal, the names of a few online journals were proposed. A researcher pointed out that she was not inclined to publish in them because that type of publication is not high ranking, and does not help scientists move ahead in their careers. In other words, academic management techniques (such as recruitment procedures, career opportunities, rankings, etc.) 'punish' scientists who step outside the paradigm and question the normative (monetary, socio-economic) model, even if they do so in search of answers to social issues.

2.3. Boundaries and paradoxes

Today, several phenomena are being highlighted that were not predicted by the dominant paradigm. Pollution, the strain on the earth's natural reserves, the loss of biodiversity and ecological resilience, the disproportional impact of technology on the life of different groups, all reveal that the promise that science and technology would lead to emancipation and wellbeing for all, is not being realised. How to create a better balance between technological achievements and

democratic processes, giving equal opportunities to a decent life for all groups both now and in the future?

Women until now, in spite of equal intelligence or academic results, occupy fewer top positions in scientific institutions and thus have less (power) to lose within the dominant institutions. We could even state that women have everything to gain from a more democratic scientific practice and a less patriarchal paradigm. The hypothesis we therefore propose is that a blueprint for a more democratically anchored technology can be drawn up on the basis of gender. It does not suffice to lead (highly educated) women to science, nor to train women (with lower qualifications) to become ICT users. These are important, but inadequate HE solutions that leave the system intact. They do not leave room for questioning the mechanisms of power within the scientific model. Can insights acquired through feminism contribute to what Robertson (2008: 22) calls a SHE scenario: Sane, Humane, Ecological?

3. From HE to SHE scenario

The concept of 'gender' has been introduced into the feminist argument in order to distinguish between the biological characteristics of the sexes and socially construed inequalities. The fact that women are able to bear children does not mean that they are predestined to carry out caring roles. It is not because men cannot breastfeed that they cannot care for the future generations. If humans in society take up different positions, that is not exclusively determined by their sex, but it is also related to mechanisms of power. To help memorise this, we take the formula : $G = s \cdot p$, where G is for gender, s, for sex and p for (social) position of power (empowerment of powerlessness). The formula (which of course is not intended for quantitative calculations) shows that sex, a characteristic of an individual (micro level), is linked to a social position (macro level) that gives access to power or leads to powerlessness. Expressed another way: gender is not about peoples' individual characteristics, but about the roles that they have (or don't have) access to, roles that are valorised by an attribution of (unequal) economic, political or cultural power in society.

3.1. Gender: a concept with a turbulent past

Gender is a promising concept because it illuminates the link between elements at different levels, and takes into account both the bio-genetic (micro) as well as the socio-cultural (macro) level. The epistemological implications of this multi-level vision have not yet been sufficiently studied, perhaps also because the dominant paradigm prefers to reduce everything to one single level of explanation (i.e. the micro level). Multi-level mechanisms are more difficult to express as natural laws and statistical formulas, which makes it difficult to study them 'scientifically'. Feminism, the intellectual movement from which the concept of gender sprouted, and gender studies, the accompanying area of specialisation, are marginalised in the academic world. The intellectual potential of the gender concept is disappearing because it is being reduced to a mono-dimensional

concept, and is understood as synonymous for 'sex' (or 'sexual identity'). It refers to the number of men and women (or gays and lesbians) that have a certain characteristic (behaviour, illness, choice of study, etc.), or it refers to the role of structures that consolidate this. The (unsustainable) macro mechanisms are disappearing from view, and gender appears as merely an issue for "frustrated women". It is seen as a weak scientific concept rather than a fundamental innovative framework leading to a more egalitarian and sustainable view on the socio-economic system.

Even within feminism, due to its complex and innovative nature, the interpretation of the gender concept has been far from unambiguous (Snick & De Munter 1999). For some feminists, the link between sex and power means that gender positions are *merely* defined by power mechanisms; and given the fact that these are unjust (for women), every difference between the sexes is declared invalid. This 'equality thinking' declares biological and psychological differences meaningless, and focuses only on mechanisms that hinder women from taking up the roles (or position) of men. Men must of course also be prepared to carry out the 'demeaning' role of care provider. The fact that today men in the dominant system are put under a lot of pressure to produce, that they are more susceptible to depression and suicide and are over-represented in prisons, is not considered by these equality-feminists to be an issue. They accept that competition and individualism are the most important 'values' in society and do not call these into question. Of course, since competition is accepted even by these feminists as the dominant (or desirable) value at societal level, it is not surprising that the new man remains overwhelmingly a fanciful reverie.

Other feminists in turn see this 'equality ideal' as a form of disdain for everything women have built up throughout history in terms of experiences and skills; it forces women into a male pattern and restricts their freedom of choice. This group of feminists defends the differences between men and women (differential thinking) and emphasizes the value of femininity. Differences at the micro level become the central focus and attempts at equality are seen as an expression of inequality (as it reflects an under-valorisation of things female). This tendency too reduces the multi-level analysis to a linear view and results in paradoxes. Any woman who wants to make a career in a male environment and play the game hard, does not seem to respond to the ideal of a 'real' woman: and so the freedom of choice of these women again is restricted (by feminists).

3.2. Underprivileged women offer an insight

A new impulse for the notion of gender as a multi-level concept came from Afro-American women. They made it clear to the first white, middle class feminists that if these ladies could now have careers, this was only possible because they kept other (coloured, less well educated) women in the position from which they had just liberated themselves. The link between the individual and the societal level came into the spotlight again, but this time with a focus not only on gender but also on ethnicity and level of schooling. As long as feminism only took sex as an analytical category, the power mechanisms at higher levels remained invisible, so that they popped up again among women.

The Afro-American feminists indirectly made it clear that a more just society requires changes at different levels simultaneously. Consequently, the prompt for the gender concept needs to be

refined to $G = S \cdot p^2$. In this formula the capital S refers to several social rifts; in addition to sex it is also necessary to take into account class, ethnicity, migration, sexual identity, family context, age, etc. In gender studies this is called 'intersectionality'. The fact that gender differences also appear within poverty statistics, makes the importance of this clear: anyone who combines several handicaps (for instance a single mother with lower qualifications) is more vulnerable to poverty. Depending on people's position in terms of these variables, their power increases or diminishes exponentially, hence p^2 . With this formula, we are not suggesting that exclusion can be calculated exactly or that a linear correlation with certain fault lines can be established; it does however help us to bear in mind that a multi-level approach and intersectionality are essential components of a gender analysis. It also shows that equality between the sexes can only be sustainable if power is redistributed at all levels, from micro to macro.

3.3. Gender-as-transition

It is not appropriate to analyse the democratic deficit of technology at any one single level either. The issue is not just that the technology sector employs fewer women, or that women are less adept when it comes to using technology. The fact that our society becomes more 'technological' implies that different groups (older people, people with lower academic qualifications and those with a lower income) are losing a grip of central process in societal life. To solve this problem it is not sufficient to allow equal numbers women to contribute to this dominant model of technological development; several strategies are required.

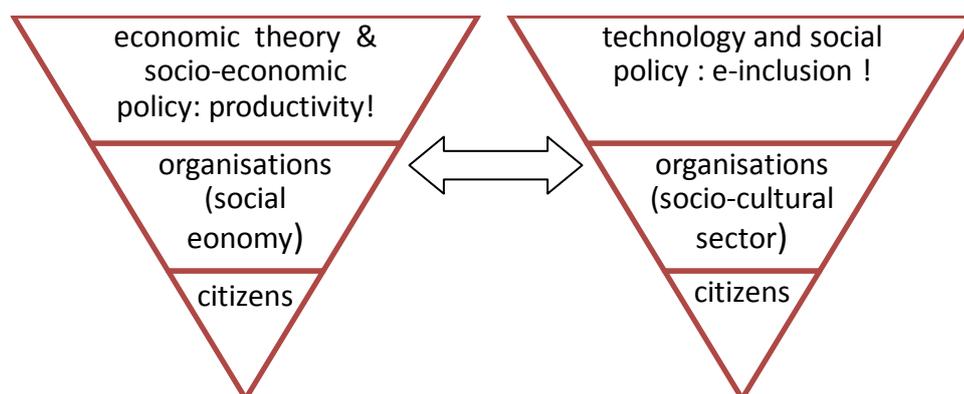
Efforts at luring more women into the technology sector or into using technology is what we call a Women In Development (WID) strategy (Levy: 1997). This strategy does not question the concept of development, but it camouflages the inherent democratic deficit by presenting equal numbers of men and women as the (only) solution. But suppose that women were to work the same as men on ensuring the penetration of nanotechnology in our body and the environment, or on disseminating technologies that damage the health or the environment of future generations or that lead to climate change, nuclear waste or scrap heaps of toxic substances, then we would have made no progress at all. The 'gender mechanisms' would continue to play at the cost of 'others', of people in developing countries, of future generations, but also of citizens who defend other values and models of society. Having more women in technology is only relevant if it leads to a change in the power mechanisms at work in technological development and to more ethical and democratic relations (Snick & De Munter 1999). The debate held today needs to contribute to a transition towards a more sustainable development model. Therefore, the Women-In-Development (WID) policy only makes sense if it is complemented by Gender-As-Transition (GAT) strategies. Solutions at micro- and mesolevel are only sustainable if they also lead to a societal (macro level) transition. Given the fact that most analyses in gender literature focus on individuals (women) and on organisations that 'format' them, here we will mainly explore scenarios that focus on societal institutions and systems. This way we will try to draw the outlines of a SHE scenario, which we would like to use here as an acronym for 'Sustainable', 'Holistic' and 'Egalitarian'.

4. A gender framework for sustainable technological development

We will try to create as clear a blueprint for a renewed debate about technology as possible. What follows is the result of more than 15 years of research, based in a 'different' intellectual infrastructure and in an organisation that work with women with lower qualifications. What we propose here therefore has already been tried out. The goal is not to formulate a new normative paradigm on the basis of philosophical or science policy grounds; it is an attempt to give visibility and public recognition to a different form of knowledge that has been developed laboriously and patiently. We outline three assumptions about what 'right' (correct as well as just) knowledge may be and we apply them to the issue of the digital divide.

An example. In the case of, say, a cleaning company, a computer is a handy aid for a lot of the tasks. In financial terms, however, it is more efficient if it is not the cleaning ladies who deploy these technological aids, but the administrative employees. Because the economic system and science use financial profitability as the only parameter, a competition arises for the 'scarce' access to ICT, in which women with lower qualifications are in a weaker position than those qualified for administrative work. If a (different) government department next wants to combat the digital divide, it does not attack it at this macro level, but it encourages women to take computer lessons after working hours. Given that these women continuously receive the (implicit) message that computer training for them is not 'profitable', the government should not be surprised that these efforts produce few results. Attention for so-called fringe conditions (child care, mobility, cost price) also remains blind to this covert formatting of women!

Figure 1 The classic policy model



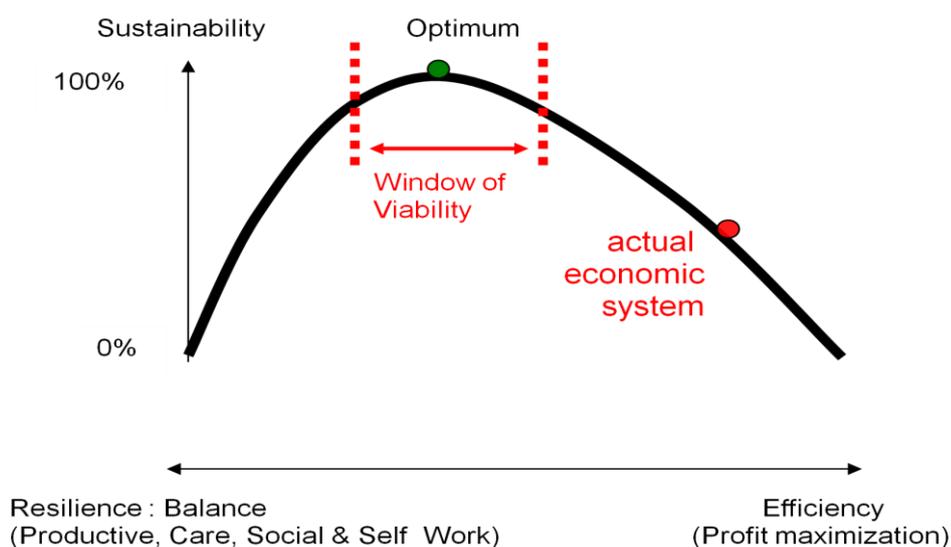
4.1. Sustainable: walking on two legs

Systems theory has carried out extensive research into the factors that determine the sustainability of systems. The balance between two variables appears to be crucial. On the one hand there is a need for efficiency. If everyone is heading in the same direction, if there are no jamming stations or rifts between the components, then they all work together optimally in a

streamlined manner. The quest for efficiency imposes itself by definition as the only value, and leaves no room for doubt, dialogue or alternatives. Hierarchy is required in order to ensure efficiency; if a direction or a goal is established, with unambiguous, preferably measurable indicators, it is possible to increase efficiency. However, it becomes risky when all transactions are defined so narrowly and all the different steps are interconnected so stringently, that a shock can cause a whole system to crash like a row of dominos. This happened in the financial crisis of 2008, for example, when the fall of Lehman Brothers in the U.S. ended up shaking the foundations of Iceland, because all financial products (including very toxic ones) are distributed around the world as a consequence of ultra-efficient strategies (including information technology) (Lanchester 2010).

Therefore, the other parameter necessary for sustainability is resilience, the capacity of systems to rebound after a shock, which depends on the degree of diversity and connection between the elements. If the chain of dominos is interrupted, or if different chains are positioned alongside each other, the whole will be able to survive a crisis much better. The hiatuses, the holes in the chain of causality, can also lead to the emergence of new constellations when the old ones are not longer adapted to a changing environment. While the system no longer functions 'mechanically', there is freedom and room for thinking about alternatives.

Figure 2 Sustainability curve



(source: Ulanowicz, R., Goerner, S., Lietaer, B. & Gomez, R. (2009), 'Quantifying sustainability, *Ecological complexity*, 6, 27 – 36.)

An oak plantation for instance would be maximally efficiently if it plants oaks exclusively. At the same time this renders it vulnerable: if a disease attack the oaks, all is lost. In order to absorb this kind of shocks, a certain degree of 'inefficiency' is necessary. If you also grow beech and chestnut trees, you can switch over temporarily to these and keep the business running. Micro-organisms

can restore the balance in the soil and allow the oaks to grow again. Of course this necessary biodiversity should not be allowed to take over to such a degree that the plantation becomes a jungle. Maintaining a balance between the two parameters will guarantee the profitability and sustainability of the company. Applied to the field that concerns us here, the curve shows that some democratic input – to complement the highly specialised expertise – can make technologies more sustainable, because it forces science to walk on two legs ! One foot sets out the direction, while the other reacts to changes in the environment, shifts the centre of gravity, adjusts the direction and restores balance. There is no hierarchy between the two legs: both are necessary in order to progress in a pluralist and evolving society!

It is clear that modern technologies obtain a high score in terms of efficiency. Scientific disciplines become specialisations, focusing on one single aspect of reality. The further technology advances, the smaller the domain it relates to. Scientific progress goes hand in hand with an increasing degree of exclusivity: anyone who is not a specialist is left behind. The same appears in the academic world as a whole: the two sexes are equally represented among students (there is diversity), but the closer to the top, the fewer women remain. Hierarchical, competitive structures seem to operate in a way that is more tailored around men. Or perhaps women are less interested in isolating themselves inside a narrowly defined discipline, preferring to maintain contact with social reality. The fact that within an academic career activities ‘outside’ the paradigm don’t pay, has already been illustrated.

If we approach the problem of the digital divide ‘walking on two legs’, several innovative avenues open up to us. In order to develop innovative knowledge in a ‘democratic’ and ‘inclusive’ manner, the knowledge monopoly of academic institutions must be broken down: horizontal knowledge networks also deserve to be given structural support. Scientific policy must recognise these types of intellectual infrastructures as an equally important mainstay alongside the classic research institutes. Only in this way will the necessary conditions be fulfilled to constantly readjust specialist knowledge and technology in response to social problems.

It is vital that in addition to women’s organisations working towards ‘Women In Development’, networks that promote (gender as) transition too are structurally embedded. The fact that women acquire power in science and technology is only of relevance if they also use that power to make these very structures more sustainable, egalitarian and democratic. Once women have strengthened their power position within the system, they have to be able to fall back on innovative, more democratic models and frameworks. It is clear that thereby competition can no longer be the single leading principle. It will be in the interest of men as well if a greater balance is created between the pressure towards productivity and other parameters; therefore, it is also in their interest to see women as partners over the long term and not just as competitors.

The competitive logic, as mentioned earlier, goes hand in hand with financial-economic mechanisms. In the democratic deficit, the role of the knowledge economy with its technology markets and intellectual rights should not be underestimated. It is more profitable for companies to invest in technologies that have a large base of clients with high purchasing power, than in technologies that support the participation of underprivileged people. It is more profitable if

cleaning women stay away from computers. The gauge for success in the competitive battle is interest-money, money that is paid out by banks, who pay out interests on savings using money gained from the interest charged on debts. As long as this is the only recognised currency, competition is unavoidable and unrelenting; this system always needs 'poor people' (people with debts who increase their debt by having to pay interests) in order for the rich to become richer (by acquiring interests on their savings). As long as this remains the only accepted form of payment, the battle is lost in advance. The only solution is for the government to leave room for complementary ways of valorising work (Lietaer 2011).

A great deal of these 'complementary' initiatives already exist, but they are lacking in efficiency because they are forced to work on a project base, 'in the margins' of the dominant institutions. A great deal of 'cultural creatives' are working on their own initiative, each in their own corner, lacking the 'connection' that is essential in bringing about resilience. Therefore, policy must create appropriate frameworks and separate budgets for both types of players, and establish the conditions for their mutual cooperation, so that 'walking on two legs' becomes a politically supported movement.

4.2.Holistic: from fragmentation to 5-TWIN

Specialist thinking splits social reality into different policy domains, each of which has its own requirements in terms of efficiency. As the example of the cleaning company shows us, this actually causes different domains to work against each other. The policy on employment ("no computers for the cleaning ladies") subvert the policy on e-participation ("computers for all citizens"), and yet both policies are convinced that they are instrumental in fighting poverty and exclusion. In order to increase sustainability, it is necessary to use not just the monistic viewpoint, but also a holistic analytical framework that takes into account *simultaneously* different domains of life and types of work, and that exposes the underlying tensions among them.

Years of research carried out with lowly schooled women acting as co-experts have enabled Flora – a Belgian network of expertise on gender, resilience and interdependent economics - to develop this type of framework. It comprises four types of work that the women co-experts consider to be important: productive work (providing for material needs), care work (care for previous and future generations and the environment), social work (citizenship, social participation, networking), and self-work (investing in personal wellbeing and unfolding your own identity and talents). Because the dominant objective of 'achieving efficiency' and the monetary logic constantly appear to let the productive work outweigh and undermine the other types of work, the correction of this dominant paradigm has been added as a fifth type of work. The result is the 'Five Types of Work Integrating Network' (5-TWIN).

Figure 3 Five Types of Work Integrating Network (5-TWIN)



If one looks at the digital divide using this analytical framework, we see that the ‘efficient’ activation policy only focuses on women’s self work (cleaning qualifications) with a view to productive work (a job in the cleaning sector), but at the expense of their social work (participation in the digital society) and of their care work (helping their children to safely navigate the internet). In order to combat the digital divide (e-citizenship, social work) policy focuses on individual training (computer courses, self work), possibly taking into account care work (fringe conditions in terms of child care), but does not see that productive work (with its implicit message that ICT training for cleaning ladies is not worth the investment) works covertly against all these efforts. Consequently, the impression can emerge that women who do not respond to training opportunities offered to them, are actually actively choosing to remain outside the digital society: this confers on them a sense of culpability that undermines their self work, and places the threshold for participating or daring to participate even higher.

4.3. Egalitarian: from pyramid to horizontal triad

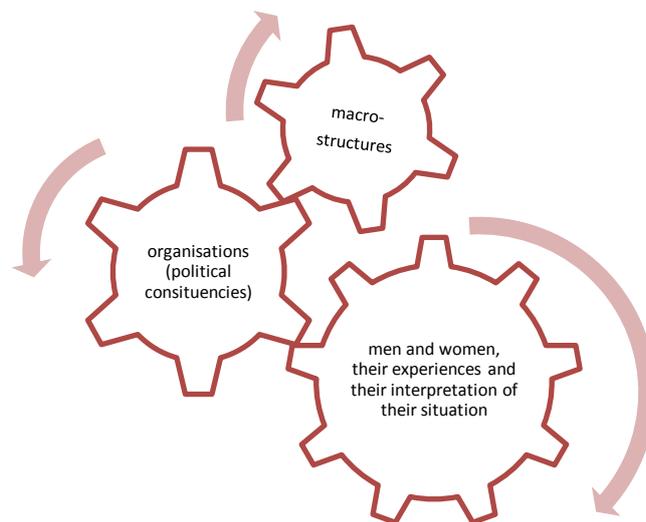
Structures in which a different type of ‘knowing’ is created, by definition cannot be organised in the same way as the hierarchic scientific and policy institutions. The dominant paradigm embodies a top-down model (that is linear and that zooms in on one particular dimension or domain, see figure 1): the norm is formulated at the political-economic macro level, while civil society organisations (socio-cultural institutes, schools, media, social economy companies that help people reintegrate into the workplace, etc.) are used in order to model citizens according to this norm. A resilient intellectual infrastructure, on the contrary, is horizontal and multi-dimensional, like a piece of fabric with different threads and cross-threads that has sufficient ‘holes’ in it to create resilience, openness and divergence.

The knowledge that emerges through this, should not be produced by experts who develop abstract analytical frames and concepts with which for example they study underprivileged

women (as objects of science), but should do justice to the ‘phenomenology’, the real experiences and insights of the people themselves. Whereas within the dominant structures people living in poverty are the *object* of poverty policies or research, a sustainable and ethical model will do justice to the contribution *they* have to make to human development. The encounter with the ‘other’ (otherness, diversity) thus makes it possible to acquire innovative knowledge and draw up democratic policies; this co-production of science and policy requires the creation of a suitable methodology and intellectual infrastructures.

Caren Levy (1997) outlines the network (or web) that we call here Gender-As-Transition. The basis of this is conceived as a triad in which the experience of men and women and their interpretation of reality (micro) finds its way, via political pressure groups (meso), to representative politics (macro), and from there is translated into programmes, projects, budgets, administrative procedures and research.

Figure 4 The triad for the institutionalisation of gender



The difference between men and women is easily recognisable, and it elucidates the fact that it is merely an abstraction when scientists talk about ‘people’ as genderless, classless or non-physical beings. By thinking in terms of gender, we are obliged to take note of differences. Gender makes it impossible to talk about people in universal terms, but shows that we all stand on one side or another of a fault line (S), and that this has an impact on our social position and experience (p²). Only by listening to ‘the other’, by acknowledging his or her embodied knowledge on the same footing, can sustainable science emerge. By listening to the experience and vision of men and women on an equal footing, organisations (through a process of co-construction of knowledge) can develop expertise concerning a more sustainable society, which can also nourish politics.

5. Conclusion

Gender is an inspiring concept for restructuring science and technology in function of a (socially) sustainable society. A restructuring that walks on two legs: efficiency and resilience. A restructuring that offers different perspectives: both the Women-in-Development (allowing women to take power positions in technology) as well as a Gender-as-Transition perspective (allowing all groups in society to have a say in the direction technology is taking society). A restructuring also that no longer looks at situations from a linear point of view, but that sees them as expressions of phenomena that occur at the same time at micro, meso and macro levels. A restructuring, finally, that enables people to be more than just a factor of economic production, and that recognises that sustainability is more than ongoing economic growth.

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Abstract

Usually the gender issue in the domain of technology is narrowly defined in terms of the lack of women active in the institutions where technology is developed and produced. Thereby technology is often presented as something inherently good, and it is women's lack of interest in this field that is considered problematic. Gender studies take women's preferences, values and behaviour patterns as objects of research with a view to 'correcting' them. However, in the light of the negative impact technologies can have on the lives of people, on future generations and on the planet as a whole, this normative perspective can be called into question. In this essay we explore how gender, defined as equal opportunities for all groups of people (on the intersection of sex with other variables) can serve as a key to a more sustainable approach and institutionalisation of technology.

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