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Participation of women and girls in the national STI system in South Africa based on the Gender Equality – Knowledge Society Framework

25 November 2011

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ACADEMY OF SCIENCE OF SOUTH AFRICA

Applying scientific thinking in the service of society

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Introduction and Context

This report brings together various information and data pertaining to the status of women in different spheres of South African reality (health, social, economic, access to resources, opportunities, etc.) as well as women's participation in the knowledge society, which is constructed around the central notion of science, technology and innovation (STI). The overarching framework within which these diverse elements are organised and presented is one that was developed by Women in Global Science and Technology (WISAT).

According to the developers of the *Gender Equality and the Knowledge Society framework*, it provides a broad assessment which could offer a valuable and necessary starting point to measure the participation of women and girls in STI in various global markets and benchmark status and progress. The framework applies a gender lens to the major indices of STI, ICT and the knowledge society. Its objective is not only to call attention to the level of opportunity and participation of women in a national innovation society but also to highlight key areas of strength and weakness in comparison with other countries and regions. The framework incorporates indicators relating to the ability of women and men to participate in STI: access to science and technology education, access to and use of technology, decision making in knowledge society sectors, participation in science, technology and innovation systems, and access to lifelong learning. It also assesses the base conditions for socioeconomic and political development which determine the ability of both women and men to contribute to the knowledge society: health status, social and economic status, level of opportunities available, level of political participation, access to resources and enabling policy environment.

There is no doubt that the information and data selected for this report – often though on the basis of availability – will serve as a valuable resource for those interested in gender mainstreaming and the broader conditions affecting women and their participation in the knowledge economy. The task now rests with WISAT and OWSD to present the framework contents for South Africa within a global comparative perspective in relation to other developing countries.

Dimension 1: Enabling Policy Environment

Gender equality is a core ideal preserved in the Bill of Rights of the South African Constitution of 1993. A national "gender machinery" has therefore been put into operation, consisting of a set of co-ordinated structures within and outside government with the aim to achieve equality for women in all spheres of life, be it political, civil, social, economic and cultural. The ultimate objective of the gender machinery is to achieve the government's national and international commitments to gender equality, as contained in the National Policy Framework for Women's Empowerment and Gender Equity. These national machinery structures are located at the executive level, in Parliament, as well as in civil society (James et al., 2006, p. 13).

A national co-ordinating body located in the Presidency, the Policy Coordination and Advisory Services (PCAS), has the function to facilitate integrated strategic formulation and integration across government. This national co-ordinating body is also responsible for the effective co-ordination of the national gender programme, as gender is located under the special programmes of PCAS (www.thepresidency.gov.za). It aims to guide and mobilise ministries, provinces and local government towards integrated programme delivery. The objectives of the co-ordination framework include gender mainstreaming, setting goals and objectives for the national gender programme, establishing clear lines of communication and accountability, and developing a dynamic management information system that facilitates informed implementation (James et al., 2006, p. 13).

Two further structures exist at the executive level; both are crucial for gender mainstreaming.

The first is the Ministry for Women, Children and Persons with Disabilities (MWCPD), which was announced by the president after the fourth democratic election in 2009 and which now incorporates the former Office on the Status of Women (OSW) in the Presidency. The ministry is responsible for promoting and realising the protection of women's rights and for guiding the government in its efforts to achieve national and global gender equality goals. The MWCPD also facilitates the implementation of international obligations on the rights of women, particularly those obligations to which South Africa is a signatory. Its role entails co-operation with and formation of partnerships relating to the protection and promotion of gender equality. The ministry has also adopted the mainstreaming approach which should ensure that issues of women and gender equality are cross-cutting throughout the work of government (Mayende-Sibiya, 2010; www.wcpd.gov.za/women). The MWCPD has set itself the following immediate objectives:

- To develop a legislative framework – Gender Equity Bill – for enforcement of 50/50 gender parity. Efforts will also be made to unblock limitation in meeting gender targets in the public sector and canvassing private sector commitment and action in this area.
- To establish a Women Empowerment Fund to facilitate funding for women empowerment initiatives. There is still a concern that the existing empowerment funds are either inaccessible to ordinary women or are not structured to enable women in rural areas to break the shackles of poverty.
- To respond to the challenge of violence against women. This includes preventative interventions, empowering women to report cases of abuse, mobilization of community action against these incidents and improving police ability to respond to these cases.

The Gender Equality Bill, which the ministry is currently working on, will provide the necessary legislative authority to hasten the empowerment of women and address issues of enforcement and compliance towards the attainment of the government's target of 50/50 gender parity. The process involves consultation with civil society and other stakeholders and the final Draft Bill will be submitted to cabinet for approval by March 2012 (Xingwana, 2011a, pp. 5-6).

Secondly, also at the executive level, are the gender focal points in national government departments. Their main task is to ensure the effective implementation of national gender framework at an operational level. The gender focal points are responsible for the formulation and implementation of effective action plans to promote women's empowerment and gender equity in the work of national government departments, in other words, to ensure the integration of a gender perspective into all policy and implementation activities in that department. Success of the focal points has however been varied (James et al., 2006, p. 13). Examples of gender focal points include the Gender and Women Empowerment Unit in the Department of Trade and Industry, and the Gender Equity Directorate in the Department of Education.

In addition, the Women's Parliamentary Caucus is a multi-party caucus in which women in Parliament can discuss and debate gender issues and provide capacity-building initiatives for women in Parliament. Also in parliament is the Joint Monitoring Committee on the Improvement of Quality of Life and Status of Women. The committee was initially established as an ad-hoc committee but became a permanent committee in 1998. The functions of this committee are to, among others, ensure that legislation before Parliament is gender sensitive and to encourage the public, particularly women, to participate in the law making process. The committee was established among other things, to monitor the state's obligations to the Convention on the Elimination Discrimination against Women and the Beijing Platform for Action, as well as other applicable international instruments. The committee is also required to monitor the work of government departments in meeting the objectives of gender equality and equity (James et al., 2006, p. 14). A new Parliamentary Portfolio Committee as a legislative monitoring framework on the promotion and protection of the rights of women and the attainment of gender equality has also been set up, after the establishment of the Ministry for Women, Children and Persons with Disabilities. This portfolio committee therefore also oversees the rights of children and persons with disabilities (Xingwane, 2011f, p. 4).

In the gender policy framework for local government, introduced by the then Department of Provincial and Local Government in 2007, an outline is provided of the structures that will constitute the gender focal points at the level municipalities (DPLG, 2007). These include, amongst others, a gender manager in the office of the major or municipal manager, tasked with the responsibility of ensuring that gender issues are incorporated in the processes of the relevant municipality.

Moreover, a number of independent statutory bodies have been established that are involved in gender issues. These include the Commission on Gender Equality, the Human Rights Commission, the Independent Electoral Commission, the Public Protector, the Public Service Commission, the Youth Commission, the Land Commission, and the South African Law Commission. The Commission on Gender Equality is an independent statutory body established to monitor the progress and achievements towards gender equality, with offices throughout the country. There have been numerous changes in leadership and the appointments of commissioners within the committee, which has given rise to problems in terms of direction and delivery (James et al., 2006). The functions of the Commission on Gender Equality form part of the departmental budget of the Ministry for Women, Children and Persons with Disabilities (MWCPD, 2010a).

On a diagnostic note, although South Africa's multi-agency national gender machinery is globally acknowledged as one of the most advanced machineries, lack of financial and human resources limited it from achieving its original objective of truly transforming women's lives (Xingwana, 2011h, pp. 6-7).

South Africa has also committed itself to close adherence to a number of international and regional instruments that promote the development of women in all spheres of life. These involve:

- Beijing Declaration and Platform for Action (1995)
- Convention on the Elimination of All Forms of forms of Discrimination Against Women (CEDAW) ratified by South Africa in 1995
- United Nations Millennium Development Goals (MDGs) of halving poverty and unemployment by 2014
- The Commonwealth Plan of Action for Gender Equality 2005-2015
- SADC Declaration on Gender and Development and its Addendum on Violence Against Women
- Protocol to the African Charter on Human and People's Rights on the Rights of Women in Africa (2003).

Lastly, in October 2009 the South African Minister for Women, Children and People with Disabilities and the Minister of Women Affairs of the Federal Republic of Nigeria also signed a Letter of Intent committing to work towards the development of a Memorandum of Understanding focusing on women and gender issues between the two countries (MWCPD, 2009).

Dimension 2: Health Status

Since 1994, with the country's change to democracy, a number of initiatives have been implemented to improve access to health services by women. One of the first initiatives was to remove user fees for pregnant and lactating women, and for children under the age of six. In 1997, maternal deaths became notifiable and eventually a national committee was established to enquire into all notified maternal deaths within health facilities in order to determine the causes thereof (MWCPD, 2010b, p. 6). The report to the committee indicated the following as the five major causes of maternal death: (1) non-pregnancy related infections – mainly resulting from AIDS (43.7%); (2) complications of hypertension (15.7%); obstetric haemorrhage (ante partum and postpartum haemorrhage (12.4%); pregnancy-related sepsis (9.0%); and pre-existing maternal disease (6.0%) (Stats SA, 2010a, p. 68). The report further suggested that the health facility or institutional maternal mortality rate for HIV negative women was 34 per 100˚000 live births while that for HIV positive women was 328/100˚000 live births and 275/100˚000 live births for those not testing. This means that HIV positive pregnant women are ten times more likely to die in child birth than HIV negative women. However, other studies produced even higher estimates in this regard. In fact, in 2007, the figure was estimated to be 625 per 100˚000 live births. Thus, the current level of maternal mortality in South Africa is far higher than the MDG target of 38 per 100˚000 live births by 2015 (MWCPD, 2010b, p. 7).

It needs to be added that in 1996, the Choice on Termination of Pregnancy Act was passed by parliament, which enabled women to have access to legal and safe terminations, thereby contributing to a decline in morbidity and mortality from unsafe abortions among women of child-bearing age. A key challenge to ensuring access to safe terminations is the provision of such services at primary health centres and all hospitals. The Act was amended in 2008 to allow a greater proportion of mid-level workers to provide pregnancy termination services (MWCPD, 2010b, p.5).

The government also renders a comprehensive package of care for those infected and affected by HIV/AIDS. Strategies are in place through the Prevention-of-Mother-to-Child Transmission programme to ensure that by 2014/15, less than 5% of babies born to HIV positive mothers are HIV positive. These strategies include the integration of Antenatal Care and HIV/AIDS services, so people do not have to travel from one health facility to another to access each of these services. In addition, HIV positive pregnant women receive dual therapy from 14 weeks of pregnancy until post-delivery (MWCPD, 2010c).

HIV/AIDS prevalence in South Africa differs by gender and age and is highest among women of child-bearing age, as can be seen in Tables 1 to 3 below. One of the concerning findings of the 2008 HIV prevalence survey is the sustained high levels of HIV infection among young females. For example, among 15-19-year-olds, female prevalence is 2.7 times higher than that of males (see Table 2). In contrast to males, HIV prevalence among females increases even more dramatically in subsequent age cohorts, reaching 21.1% among the 20-24 year-olds, and 32.7% among the 25-29 year-olds. By age 30-34 the disproportions in HIV prevalence are much smaller, although females still have a higher HIV prevalence (Shisana et al., 2009, p. 30).

Table 1: HIV prevalence among South African youth, 2009

	Estimate	Low-high estimate
Young men (15-24)	4.5%	4.1 – 5.0
Young women (15-24)	13.6%	12.3 – 15.0

Source: UNAIDS (2010, Annex 1, p. 183)

Table 2: South African HIV prevalence, by sex and age, 2008

Age	Males	Females
2-14	3.0%	2.0%
15-19	2.5%	6.7%
20-24	5.1%	21.1%
25-29	15.7%	32.7%
30-34	25.8%	29.1%
35-39	18.5%	24.8%
40-44	19.2%	16.3%
45-49	8.4%	14.1%
50-54	10.4%	10.2%
55-59	6.2%	7.7%
60+	3.5%	1.8%

Source: Shisana et al. (2009, Figure 3.1, p. 31)

Table 3: South African HIV prevalence, 2001-2010

Age	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Adult women 15-49	18.7%	19.2%	19.4%	19.6%	19.7%	19.7%	19.7%	19.7%	19.6%	19.7%
Adult women 20-64	19.2%	19.3%	19.6%	19.9%	20.0%	20.2%	20.3%	20.3%	20.3%	20.4%
Adult men 20-64	14.2%	14.0%	14.0%	14.0%	13.9%	13.9%	13.8%	13.8%	13.7%	13.8%
Total female population	10.8%	11.2%	11.5%	11.7%	11.8%	11.9%	12.0%	12.1%	12.2%	12.4%
Total male population	7.8%	7.9%	8.0%	8.1%	8.1%	8.2%	8.2%	8.3%	8.3%	8.5%

Source: Presidency (2010, p. 41)

The government also provides antiretroviral treatment (ART) to pregnant women at CD4 count of 350 or less, to enhance maternal survival and reduce the possibility of vertical transmission. HIV and tuberculosis (TB) are closely inter-related, and a high proportion of HIV positive people are also TB infected. ART is therefore also provided to people co-infected with TB and HIV at a CD4 count of 350 or less. This is expected to contribute significantly to reducing morbidity and mortality associated with TB and HIV and AIDS (MWCPD, 2010b, p.6). In April 2010 the government communicated that HIV and AIDS and TB are being integrated and will be treated together in health centres (MWCPD, 2010c). No sex-disaggregated figures could be obtained for TB prevalence. It has been reported that the TB and HIV/AIDS co-infection rate in South Africa is one of the highest in the world, namely 73% (DoH, 2011b, p. 7).

To improve management of sexually transmitted diseases, 100% of sexually transmitted infections services in the public sector were offered by adequately trained staff using Syndrome Management guidelines in 2008/09 (MWCPD, 2010b, p.6). The prevalence rates of syphilis among pregnant women presenting at public antenatal care clinics are shown in Table 4.

Table 4: National syphilis prevalence among antenatal clinic attendees, 2000 to 2007

	2000	2001	2002	2003	2004	2005	2006	2007
Female	4.9%	2.8%	3.2%	2.7%	1.6%	2.7%	1.8%	2.8%

DoH (2008b, Figure 8, p. 21)

Moreover, screening for the early diagnoses of breast and cervical cancers and their precursor stages is still low at 30%. Cervical cancer screening is available free of any charges within the public system at the ages of 30, 40 and 50 years but earlier for women with HIV and other sexually transmitted infections (MWCPD, 2011, p. 8).

Malaria is not endemic in South Africa, and does not therefore pose a major health risk except in some of the country's northern areas. Most cases of malaria in South Africa are found in parts of the Limpopo, Mpumalanga and KwaZulu-Natal provinces. The death rate due to malaria in South Africa has remained very low at 4-10 per thousand since 1999 (Stats SA, 2010a, p. 81). During the 2006/07 malaria season, a total of 6 615 malaria cases were reported, according to the Epidemiology and Surveillance Directorate of the Department of Health. Of these cases 35% represented women although it could be slightly higher given that in 8% of cases the sex of the patient has not been reported (DoH, 2008a, p. 12).

Given the burden of HIV/AIDS and maternal mortality, the life expectancy at birth for women in South Africa is significantly below that of the average woman in the world. Also, the life expectancy of women in South Africa is only marginally higher than that of their male counterparts whereas, in terms of world averages, the sex difference is more pronounced (Tables 5 & 6). For instance, internationally there is a 3-year difference between women and men with regard to healthy life expectancy (61 versus 58 years) whereas in South Africa this is reduced to only one year difference (48 versus 47 years – Table 6).

Table 5: Life expectancy at birth (years), South Africa versus world, by sex

	1990	2000	2009
South Africa			
Men	59	54	54
Women	68	59	55
Both sexes	63	56	54
World			
Men	62	64	66
Women	66	68	71
Both sexes	64	66	68

Source: WHO (2011, Table 1, pp. 52 & 54)

Table 6: Healthy life expectancy (HALE) at birth (years), South Africa versus world, by sex

	2007
South Africa	
Men	47
Women	48
Both sexes	48
World	
Men	58
Women	61
Both sexes	59

Source: WHO (2010), Table 1, pp. 54 & 56.

Note: Healthy life expectancy (HALEs) is the average number of years that a new born can expect to live in "full health." Healthy Life Expectancy is a calculation used by statisticians and demographers to adjust life expectancy for the amount of time spent in poor health. The World Health Organization (WHO) calculates HALEs for each country in the world.

Lastly, the Ministry of Women, Children and Persons with Disabilities has expressed its full support for the establishment of the National Health Insurance, which is currently under discussion. The National Health Insurance would is expected to benefit women in terms of better access to health service (Mayende-Sibiya, 2009), as it will ensure universal access to appropriate, efficient and quality health services. The initiative will be phased-in over a period of 14 years. This will however entail major changes in the service delivery structures, administrative and management systems (DoH, 2011b, p. 4).

Dimension 3: Social Status

Human rights, including women's human rights, are at the core of South Africa's constitution and post-apartheid democracy. The human rights framework is informed by the Beijing Platform for Action and international human rights norms that are binding on South Africa. This includes the provisions of CEDAW and the Vienna Declaration and Programme of Action. These instruments provide an important framework for the advancement of women and girls. Flowing from the constitution and in compliance with CEDAW and other international human rights instruments that promote non-discrimination and equality, South Africa has introduced a number of laws that provide a framework for eliminating discrimination on the ground of gender and other grounds or combination thereof while facilitating the implementation of positive measures to address existing systemic imbalances.

The following pieces of legislation and policy constitute South Africa's key measures with regard to ensuring non-discrimination on the ground of gender or sex and facilitating the implementation of positive measures (MCWPD, 2010, pp. 24-25):

- Legislation on Equality and Non-discrimination
- The Promotion of Equality and Prevention of Unfair Discrimination Act
- Citizenship and Nationality
- National Action Plan on Human Rights (NAP)
- Strengthening National Institutions such as the Commission on Gender Equality (CGE) and the South African Human Rights Commission; and
- National Policy Framework for Women's Empowerment and Gender Equity.

Women's social status is also strengthened through the Recognition of Customary Marriages Act of 1998, which provides an opportunity for women married under customary law to call on their constitutional rights should they wish to do so (Xingwana, 2010, p. 19).

A core principle contained in the National Policy Framework for Women's Empowerment and Gender Equality is that customary and cultural practices are subject to the right to equality (Xingwana, 2010, p. 19). One of the challenges that South Africa faces is a harmful traditional practice of *ukuthwala* where young girls are abducted and forced into marriage. The South African Sexual Offences Act currently protects young girls under the age of 16 years from such a practice. The government is also searching for legal instruments to protect adult women who may still be subjected to this harmful traditional practice against their will. It is for this reason that the Ministry for Women, Children and People with Disabilities recently encouraged the South African Law Commission to investigate the appropriate legal instrument to make *ukuthwala* an offence (Xingwana, 2011c, 2011f).

Moreover, the Traditional Leadership and Governance Framework Act of 2003 provides for the establishment of traditional councils by a "recognised traditional community". Section 2 of the Act states that such a traditional council should be constituted of 40% of democratically elected members of the traditional community, and that at least a third of the members of the council must be women (DPLG, 2003, p. 47).

In South Africa the sex ratio at birth is approximately 50/50, implying that gender-selective abortions are not an issue in South African society (Table 7).

Table 7: Female share (%) of recorded births, 2000 to 2008

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Female	49.9%	49.9%	49.9%	49.8%	49.7%	49.7%	49.8%	49.7%	49.7%

Stats SA (2010c, Table 3.2.2, p. 3.2)

Violence against women has received the most consistent and profound government attention and resources. South Africa has a strong legislative framework which includes several pieces of legislation protecting the rights of women and girls, especially in relation to violence against them. Some initiatives in this regard included the passing of the Criminal Law (Sexual Offences and Related Matters) Amendment Act, 2007. The act revised existing law relating to sexual offences, in order to bring it in line with the constitutional dispensation and to provide maximum protection to victims of sexual offences, mostly women and children. It also provides a mechanism in terms of which victims of sexual offences (mostly women) can apply to have the perpetrators of the offences tested for HIV (MWCPD, 2010b, pp. 12-13). The mandatory minimum sentencing relating to cases of rape ranges from 10 years to life imprisonment.

According to official crime statistics, sexual offences in South Africa are relatively high, directly affecting about 139 out of every 100˚000 individuals in the country (Table 8). This figure, which applies for the fiscal year 2009/10, is however markedly less than the corresponding figure for 2008/09, namely 145 per 100˚000 of the population.

Table 8: Total sexual offences in South Africa for April to March 2003/2004 to 2009/2010

	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Reported cases	66 079	69 117	68 076	65 201	63 818	70 514	68 332
Per 100˚000 of population	142.5	148.4	145.2	137.6	133.4	144.8	138.5

Source: SAPS (2011)

Moreover, a study conducted by Jewkes et al. (2009, p. 3) among men of all racial groups and from different socio-economic backgrounds in the Eastern Cape and KwaZulu-Natal provinces, shed additional insight on the extent of rape in South African society. Overall, 27.6% of the men interviewed reporting ever having raped a woman or girl, and 4.6% of all men had raped in the past year. Because most men who raped reported multiple rapes, non-partner rape was overall more common than partner rape. In all, only 4.6% of men reported that they had raped a partner, 11.7% of men had raped an acquaintance or stranger (but not a partner) and 9.7% had raped both. In total, 8.9% of men said they had raped with one or more other perpetrators when a woman didn't consent to sex, was forced. Attempted rape was reported by 16.8% of men and 5.3% of men said they had attempted rape in the previous 12 months.

Government has responded with a number of initiatives to assist those affected by gender-based violence. For instance, government developed the National Policy Guidelines for Victim Empowerment that provides a framework for sound inter-sectoral and interdepartmental collaboration to eliminate such gender based violence. One of the strategies government has put in place is a shelter strategy, which was reviewed in 2008. This strategy aims to ensure that shelters for victims adhere to minimum standards of service delivery and that the programmes of these shelters are aligned to the Victims' Charter and not in violation of victims' rights. There are 96 shelters for victims of gender based violence in South Africa that render psychological and therapeutic services to victims (MWCPD, 2010b, pp. 14-15). Moreover, at least 28 Thuthuzela Care Centres have been established in various areas with high incidents of violence against women and children in the country. These are one stop centres where rape victims can lodge a case and receive counseling and medical care including prevention of HIV infection and unwanted pregnancy. The concept of Thuthuzela Care Centres has attracted attention from other parts of the world. The Thuthuzela approach has been commended by the UN Secretary General and adopted by a number of countries in Africa, e.g. Ethiopia, and also countries in other regions, like Chile in South America (Xingwana, 2011a, 2011e).

Also, in 2010, the government re-introduced the Family Violence, Child Protection and Sexual Offences (FCS) units in all policing areas. These units are specialised investigations in the detection of all types of sexual offences, domestic violence and child abuse and protection cases. These units ensure effective access to justice for women and girls. These units are fully operational in all 176 policing areas country-wide. In addition, Forensic Social Workers are provided in all the units in order to assist women and girls in presenting admissible evidence in a court of law. By introducing these specialized units within the police service, the government has ensured that conviction rates have increased (Xingwana, 2011g, p. 3).

Furthermore, in 2011, the Ministry for women, Children and People with Disabilities also focused on promoting the Domestic Violence Act to empower victims of violence and communities to use this Act to prevent cases of abuse. The objective is to mobilise women to ensure that they do not withdraw cases of abuse but allow the law to take its course. The Ministry is currently in the process of establishing an Advisory Council on Violence against Women and Children. The Advisory Council will comprise of key government departments, civil society organizations and other relevant partners and it will coordinate the implementation of the 365 Days National Plan of Action to End Violence against Women and Children. It is going to co-ordinate the various commendable initiatives implemented by various government departments, civil society and other sectors to stop this scourge (Xingwana, 2011a, pp. 9-10).

Lastly, sexual abuse and educator to learner sexual relationships are outlawed in the schooling system, and punishable by dismissal of the particular educator if found guilty. However, cases of sexual harassment and sexual violence continue to be reported in South African public schools. It must be noted that sexual harassment and sex-related crime is a major social problem in South Africa (MWCPD, 2010b, p. 29). In 2008 the Gender Equity Directorate at the Education Department developed the *Guidelines for the Prevention and Management of Sexual Violence and Harassment.* The purpose of the Guidelines is to assist public schools in maintaining minimum standard procedures to addressing allegations of sexual violence and harassment, and to specifically detail how public schools should treat victims of sexual violence and harassment, and those who have, or are alleged to have, committed such acts. They are also intended to assist victims of sexual violence and harassment with reporting procedures and in seeking intervention. In 2010, the Education Department has developed a handbook for learners to equip learners with knowledge and understanding of sexual harassment and sexual violence, its implications, ways to protect themselves from perpetrators, and where to report it in the unfortunate event that it happens (MWCPD, 2010b, p. 30). South Africa has also developed a Men and Boys Strategy on the Prevention of Gender Violence in 2008. The intention of the strategy is to promote the engagement of men and boys in the prevention of gender based violence (MWCPD, 2010b, p. 15).

Turning to women's workload and time usage, statistics show that women, one average, tend to work fewer hours per week than men do. For instance, in 2011, about 35% of employed men reported working more than 45 hours a week compared to 25% of women (Table 9). At the other end of the spectrum almost 11% of employed women reported working 29 or less hours per week compared to only about 5% of men. However, the figures also reveal that women are increasingly working more hours. This is most evident in the category of 40-45 hours per week, where the proportion of women increased from about 49% in 2008 to 54% in 2011.

Table 9: Breakdown (%) of the employed in terms of usual hours of work, by sex, 2008-2011

	2008	2009	2010	2011
Male employment				
< 15 hours per week	1.5%	1.4%	1.2%	1.4%
15-29 hours per week	3.6%	3.7%	3.7%	3.5%
30-39 hours per week	5.1%	4.6%	4.7%	5.1%
40-45 hours per week	51.1%	55.1%	56.1%	55.0%
> 45 hours per week	38.6%	35.1%	34.3%	34.9%
Female employment				
< 15 hours per week	3.2%	3.0%	2.6%	2.3%
15-29 hours per week	8.9%	9.5%	9.7%	8.5%
30-39 hours per week	10.5%	10.5%	10.3%	10.2%
40-45 hours per week	48.9%	52.1%	53.5%	54.2%

> 45 hours per week	28.5%	24.9%	23.9%	24.8%

Source: Stats SA (2009, Table 3.8, p. 15) & Stats SA (2011c, Table 3.8, p. 25)
Note: Figures from second quarter, i.e. April to June.

Although the above figures can be interpreted as to mean that women are more likely to be employed part-time than full-time, hence their fewer hours of work, it also needs to be stressed that women often devote a large share of their work to activities generally not regarded as employment. This is supported by the figures in Table 10 below, where men, on average, spend 65% of their time on market activities and women, on average, about 71% on activities relating to housework and care. Also, as can be seen in Table 11 on the next page, women spend about three and a half hours per day doing unpaid work whereas men spend only about two hours per day on the same activities.

Table 10: Distribution (%) of total time spent by men and women in terms of activity

	Market activities	Housework and care
Men	65%	29%
Women	35%	71%
Total	100%	100%

Source: World Bank (2011, Figure 5.9, p. 219)

Table 11: Average time spent, by sex and activity (hours and minutes per day), 2000

	Paid work	Unpaid work
Men	3h10	1h23
Women	1h56	3h36

Source: UN (2010, Table 4.C, p. 211)

The burden of care for those who are sick and dying falls heavily on women and girls in the family and communities. They have to wash, feed and provide various other forms of care for those who are terminally ill. Under the Expanded Public Works Programme of government, (see also Section 4) the Home and Community Based Care (HCBC) and Support Programme was introduced, which is an approach adopted by the government to mitigate the socio-economic impact of HIV and AIDS and other conditions at community level. Through this programme, many women in particular are recruited and trained to provide care to those who are sick and these caregivers receive a stipend (MWCPD, 2010c).

Hein and Cassirer (2010) provide an informative account of child care arrangements for working women. According to their account, women in the informal economy often take their children to work with them as they cannot afford to pay for childcare and may not have family to assist. For a domestic worker, it is not uncommon to leave her children with family in the rural area or closer to home with urban-based family members, especially when she lives at the employer's place. In these circumstances, the domestic worker may not see her children for months at a time as distance and lack of time prevent her from travelling back to her home regularly. Parents in the formal economy typically work full time (40-45 hours per week) with three weeks' annual leave, which is much less than the approximately 15 weeks of school holidays their children receive. Part-time and flexible work arrangements occur rarely in formal settings but, in domestic employment, many work part time (Hein & Cassirer, 2010, p. 327-329). Options for childcare for working parents include:

- Early childhood development (ECD) centres/crèches (private or community based, some school based, rare at workplaces);
- playgroups (home-based centres);
- after-school centres (mainly attached to schools but with limited facilities);
- home-based caring in the child's or other home (nanny/child-minders);
- family member or friends; or
- any combination of the above.

Work-based initiatives for childcare in South Africa, based on Hein and Cassirer's account, are few and very little private-public partnering appears to be occurring. Employer and union efforts to help workers with childcare have been somewhat limited in South Africa. The Congress of South African Trade Unions (COSATU), one of the main trade union federations, addressed this issue in the Women's Day 2007 Resolution. However, competing priorities such as basic wages tend to result in issues of gender and children often taking a back seat. There are a few cases where the union has been instrumental in bringing in a childcare facility at a workplace. Very few companies however have gone so far as to provide childcare support. Companies have been slow to respond to childcare needs, given the costs of an on-site childcare facility. There is not much evidence of government or business engagement in any dialogue concerning work-family issues, nor do businesses seem to partner with community organisations or childcare facilities to improve workers' access to childcare (Hein & Cassirer, 2010, pp. 332 -333).

Dimension 4: Economic Status

Women constitute 51% of the South African population but only 45% of the South African labour force (Table 12). The latter is defined as those between the ages of 15 and 64 who are currently working as well as those who are currently not working (but who are looking for work or until very recently had been working). The economically inactive is excluded in the calculation of the labour force. Moreover, in 2011, the female labour participation rate (i.e. the female labour force expressed as a proportion of the total female working-age population) was 48%, compared to a corresponding figure of 61% for male labour participation. As a result women also recorded a higher unemployment rate than men (28.7% versus 23.2%). Moreover, unemployment increased for both sexes over the last three years, which means decreases in the labour force participation rates of both sexes.

Table 12: Labour force characteristics, by sex, 2008-2011

	2008	2009	2010	2011
Sex distribution (%) of labour force				
Male	53.8%	54.1%	55.0%	54.6%
Female	46.2%	45.9%	45.0%	45.4%
Labour force participation rate				
Male	65.7%	63.8%	62.1%	61.3%
Female	51.2%	49.5%	47.6%	48.0%
Unemployment rate				
Male	19.9%	21.8%	23.1%	23.2%
Female	26.8%	25.7%	27.7%	28.7%

Source: Stats SA (2009, Table 2, p. 2) & Stats SA (2011c, Table 2, pp. 2-3)

Note: Figures apply to the second quarter, i.e. April to June, of the year in question.
The working-age population (15-64 years) can be broken down into three components: persons who are employed [A], persons who are unemployed [B], and persons who are economically not active [C]
The labour force comprises all persons who are employed plus all persons who are unemployed [i.e. A + B].
Labour force participation rate is the proportion of the working-age population that is either employed or unemployed [i.e. (A + B) expressed as a proportion of (A+B+C)].

Unemployment rate is the proportion of the labour force that is unemployed [i.e. B expressed as a proportion of (A+B)].

African women in particular are identified as most affected by the high levels of unemployment and poverty, with the SA Institute for Race Relations estimating unemployment to be as high as 60% amongst African women aged 16-24 years (Xingwana, 2011b, p. 2).

The sector division of employment is also different for the sexes, given that 15% of women's employment occurs in private households compared to only about 3% in the case of men (Table 13). However, female employment in private households is decreasing as well as employment in the informal and agricultural sectors, gauged from a comparison of figures between 2010 and 2011. On the other hand, female employment in the formal non-agricultural sector appears to be increasing (from 63.9% in 2010 to 65.6% in 2011).

Table 13: Breakdown (%) of employment in terms of sector, by sex, 2008-2011

	2008	2009	2010	2011
Female employment				
Formal sector (non-agriculture)	62.5%	64.3%	63.9%	65.6%
Informal sector (non-agriculture)	18.0%	16.2%	16.5%	15.9%
Agriculture	4.2%	3.6%	3.8%	3.3%
Private households	15.4%	15.9%	15.8%	15.1%
Total	100%	100%	100%	100%
Male employment				
Formal sector (non-agriculture)	73.4%	74.6%	73.9%	73.5%
Informal sector (non-agriculture)	16.3%	15.5%	17.0%	17.6%
Agriculture	7.0%	6.7%	5.6%	5.5%
Private households	3.3%	3.3%	3.5%	3.4%
Total	100%	100%	100%	100%

Source: Stats SA (2009, Table 2, p. 2) & Stats SA (2011c, Table 2, pp. 2-3)
Note: Figures apply to the second quarter, i.e. April to June, of the year in question.

A different take on employment is to view breakdowns in terms of the category of work (Table 14). In the case of both women and men the majority tend to work for others as employees (more than 80%). However, men are more likely than women to provide employment to others (in 2011, 7.8% of men were employers compared to only 2.9% of women). Women, on the other hand, are slightly better than men in creating own opportunities, given that there are respectively 10.3% versus 8.6% own-account workers among women and men. An interesting trend is that the proportion of women in self-employment appears to be decreasing (from 11.8% in 2008 to 10.3% in 2011) whereas for men it is increasing (from 7.5% in 2008 to 8.6% in 2011). This supports an earlier conclusion (Table 13) that female employment in the formal non-agricultural sector is increasing.

Table 14: Breakdown (%) of employment in terms of category of work, by sex, 2008-2011

	2008	2009	2010	2011
Female employment				
Employee	83.7%	85.4%	85.7%	85.6%
Employer	3.1%	2.6%	2.4%	2.9%
Own-account worker	11.8%	10.5%	10.6%	10.3%
Unpaid household member	1.5%	1.5%	1.3%	1.2%
Total	100%	100%	100%	100%
Male employment				
Employee	84.9%	83.7%	83.5%	83.2%
Employer	7.2%	7.7%	7.5%	7.8%
Own-account worker	7.5%	8.2%	8.4%	8.6%
Unpaid household member	0.5%	0.4%	0.6%	0.4%
Total	100%	100%	100%	100%

Source: Stats SA (2009, Table 3.7, p. 14) & Stats SA (2011c, Table 3.7, p. 24)
Note: Figures apply to the second quarter, i.e. April to June, of the year in question.

Moreover, in South Africa the majority of household income is earned by male-headed households. The results of the 2005/2006 survey of household income and expenditure show that at least three quarters (75.6%) of total household income in South Africa is earned by male-headed households. When the various sources of income are examined separately, as was done in Table 15, it indicates that 80% of the total annual household income from work is earned by male-headed households. Male-headed households also outperformed their female counterparts with regard to income from capital (78%); pensions, social insurance and family allowances (59.); other income not elsewhere classified (69%); and income in the form of imputed rent on owned dwellings (76%). Moreover, 78% of total annual household income earned from capital was earned by male-headed households, whereas 69% of income received from individuals was earned by female-headed households (Stats SA, 2008, p.12).

Table 15: Distribution of annual household income by main income source and sex of household head, 2005/06

Source	Female headed households	Male headed households
Income from work	20%	80%
Income from capital	22%	78%
Pensions, social insurance, family allowances	41%	59%
Income from individuals	69%	31%
Other income	31%	69%
Imputed rent on own dwelling	24%	76%
Total income	24%	76%

Source: Stats SA (2008, Figure 7, p. 12)

Given that the majority of household income is earned by male-headed households it is therefore not surprising that male-headed household also have higher consumption expenditure. Table 16 shows that at least one in every four (25.7%) male-headed households had their consumption expenditure within the 5th consumption expenditure quintile, while the equivalent proportion for female-headed households was only 11.3%. The

proportion of female-headed households (22.8%) with expenditure falling within the 1st quintile was larger than that the 18.1% of male-headed households (Stats SA, 2011b, p. 9).

Table 16: Percentage distribution of households by consumption expenditure quintile and sex of household head

Quintiles	Female headed households	Male headed households
5th quintile	11.3%	25.7%
4th quintile	19.8%	20.1%
3rd quintile	22.6%	18.3%
2nd quintile	23.5%	17.7%
1st quintile	22.8%	18.1%

Source: Stats SA (2011b, Figure 4, p. 9)

Note: The quintiles are based on total annual household consumption expenditure including in-kind expenditure. The cut-off points used by Stats SA for the different household quintiles are as follows: 1st quintile = R16 406,28; 2nd quintile = R26 330,08; 3rd quintile = R43 897,15; 4th quintile = R98 053,03; and 5th quintile = more than R98 053,03.

Another indication of the gendered nature of poverty is that the proportion of females living below $1 (PPP) per day has always been relatively high compared to that of males: 12.0% (females) and 10.0% (males) in 2000; and 5.3% (females) and 4.8% (males) in 2006 (Stats SA, 2010a, p.27). Figures by the United Nations Development Programme (Table 17) shows that, on average, in terms of purchasing power parity (PPP, US$), women earn less than two-thirds of what men do.

Table 17: Estimated female to male earned income, 2007

	Estimated earned income (PPP US$)	Ratio of estimated female to male earned income
Men	12,273	0.60
Women	7,328	

Source: UNDP (2009, pp. 183 & 188)

More recent figures for 2010 indicate that the median monthly earnings for men in paid employment (R3˚033) are higher than that for women (R2˚340) – women in paid employment earn 77% of what men did (Table 19 on next page). Women's-to-men's median monthly earnings ratios are also higher among Indian/Asian (100%) and coloured (78.1%) population than among black Africans (69.3%) and white population (66.4%) (Stats SA 2010b, p. viii & p. ix).

The earnings gap between women and men is evident in all occupations except domestic work. Overall, women had median monthly earnings of R2˚340 or about 77% of the R3˚033 median earnings of their male counterparts. Among managers, women with a median earnings of R9˚000 earned 75% as much as men managers with a median monthly earnings of R12˚000. The biggest gap between women and men is among skilled agriculture employees; however this should be interpreted with caution because of the small numbers involved. The gap between the two groups narrows among technicians, clerks and elementary workers where women earn 88% as much as their male counterparts (Stats SA 2010b, p. xii & p. xiii).

Table 18: Median monthly earnings for female and male employees, by race and occupation, 2010

	Median monthly earnings of women (ZAR Rand)	Median monthly earnings of men (ZAR Rand)	Women's income as % of that of men
All employees	2340	3033	77%
By race			
African	1733	2500	69%
Coloured	2383	3050	78%
Indian/Asian	6000	6000	100%
White	7640	11500	66%
By occupation			
Manager	9000	12000	75%
Professional	9500	12000	79%
Technician	7006	8000	88%
Clerk	4200	4800	88%
Sales and services	2000	2700	74%
Skilled agriculture	1517	2817	54%
Craft and related trade	1950	3000	65%
Plant and machine operator	1902	3000	63%
Elementary	1430	1625	88%
Domestic worker	1000	1000	100%

Source: Stats SA (2010b, Table F, p. xii & Table 3, p. 3)

The Department of Labour is currently in the process of strengthening employment equity implementation and enforcement mechanisms. Income differential assessments are being performed to determine the extent of race and gender disparities in salaries, and this is set for completion by March 2012 (DoL, 2011b, p.42).

To combat the broader challenge of unemployment and poverty, the Department of Public Works is leading an Expanded Public Works Programme (EPWP). The EPWP was initiated by the government in 2004, in order to create temporary work opportunities for the unskilled by using public sector expenditure. All of the work opportunities generated by the EPWP are therefore combined with training, education or skills development, with the aim of increasing the ability of people to earn an income once they leave the programme. The Department of Labour coordinates the training and skills development aspects of the programme. Under the EPWP, all government bodies and parastatals are required to make a systematic effort to target the unskilled unemployed. They must formulate plans for utilising their budgets so as to draw significant numbers of the unemployed into productive work in such a way that workers gain skills while they work, so increasing their chances of getting out of the marginalised pool of unemployed people. The Department of Public Works is responsible for leading the programme. Work opportunities are created in four sectors. The Department of Public Works formulates and coordinates EPWP programmes in the infrastructure sector. The Department of Environmental Affairs and Tourism is responsible for coordinating the implementation of the EPWP in the environment sector. In the social sector, the Department of Social Development is responsible for formulating and coordinating EPWP programmes in the areas of social and personal services (such as home-based care for people living with HIV/AIDS and early childhood development), and food and nutrition. The Department of Trade and Industry is responsible for coordinating the EPWP in the economic sector, including programmes such as incubator programmes for small businesses, which obtain work from government and community-based income-generating projects.

(www.epwp.gov.za). Of the 625 859 work opportunities created during 2009/10, women occupied 35% of these (Presidency, 2010, p. 22).

Small and micro businesses that are largely informal and not registered for value-added tax (VAT) are often a way for the marginalized poor to generate income. As Table 19 shows, among women of working age population, 9.5% operated non-VAT registered businesses in 2001 compared to 6.9% among men. Four years later, in 2005, more women than men still operated such businesses, but in 2009, this was reversed when 3.6% of men of working age operated non-VAT registered businesses compared to 3.3% of women (Stats SA, 2010d, p.˚v). However, 71% of women and 66% of men said that they operate such business because they were unemployed and had no alternative source of income (Table 20). Moreover, more women are also starting these informal businesses because they feel more equipped in terms of skills to do so (10% in 2009).

Table 19: Percentage of working-age population that operated at least one non-VAT registered business, by sex, 2010

	2001	2005	2009
Male	6.9%	5.3%	3.6%
Female	9.5%	5.9%	3.3%

Source: Stats SA (2010d, Figure 1, p. ix)

Table 20: Main reason why own business was started, by sex, 2001, 2005 & 2009

Reason	Women			Men		
	2001	2005	2009	2001	2005	2009
Inherited/family tradition	4%	3%	5%	5%	4%	5%
Unemployed/have no alternative income source	63%	71%	71%	55%	63%	66%
Retrenched	2%	2%	2%	9%	7%	6%
Inadequate income from other source	15%	5%	5%	8%	2%	3%
I like the activity	5%	7%	6%	5%	9%	4%
I have the skills of this business	3%	3%	5%	8%	6%	10%
I have the equipment for this business	1%	0%	0%	2%	0%	0%
Activity brings high income	2%	3%	1%	4%	3%	2%
Small investment needed	2%	1%	1%	2%	1%	0%
Unhappy with previous work	1%	1%	1%	2%	1%	3%
Other	2%	5%	3%	2%	4%	1%
Total	100%	100%	100%	100%	100%	100%

Source: Stats SA (2010d, Table 2A, p. 2)

At the Rural Women Summit in 2011 the Minister for Women, Children and People with disabilities, Ms Lulu Xingwana, emphasised government's commitment to focus on the systematic promotion of agricultural co-operatives throughout the value chain, including agro-processing in the agricultural areas. This should include development of support measures to increase access to markets and finance by small farmers, including basic necessities like fencing and irrigation systems (Xingwana, 2011e). In fact, the development of co-operatives has been identified by the government as one of the critical and viable means to alleviate

poverty. A co-operative is a business entity that comprises an autonomous association of people who voluntarily come together to meet their common needs (mostly economical) through a jointly owned and democratically controlled enterprise. Female membership of co-operatives is in the majority and most female co-operatives are based in the textile, service and agricultural sectors (UYF, 2003; dti, 2010).

The development of young women in rural areas is another government priority. Programmes like the newly established National Rural Youth Service Corps (NARYSEC) are important in this regard, where the emphasis is on attaining 50/50 gender parity and disability consideration amongst the recruits. There is commitment that of the 12˚000 youths to be skilled and employed through this programme, 50% should be women and almost 3˚000 should be youth with disabilities (Xingwana, 2011e). The objective of NARYSEC is to recruit and develop youth (18-35 years) in rural areas to be para-professional who will provide community service in their communities. The programme is aimed at empowering the youth with various skills. Successful candidates will undergo an intensive training programme, based on needs identified, and will receive a monthly stipend for the two year duration of the programme. After the completion of the two year training programme, candidates will work in their communities providing services in local socio-economic development (http://agritv.co.za/articles/narysec-national-rural-youth-service-corps).

Lastly, South Africa's positive best practice so far has been the provision of a social security net through the provision of social grants to an increasing number of beneficiaries, the majority of whom are women. However, South Africa acknowledges the many challenges in this area; particularly the increasing gendered nature of poverty, the fact that the condition of women has not improved measurably, despite government interventions and infrastructure injection, the lack of funding for women's programmes, and the fact that rural women, children, people with disabilities and older persons remain the most vulnerable. In this regard, South African Women in Dialogue (SAWID), a civil society organisation representing the voice of women, (amongst other organizations with a similar mandate like the Progressive Women's Movement of South Africa – PWMSA), has made various recommendations to the government, including the need for an integrated poverty eradication strategy, the targeting of the poorest families and marginalised communities with a basket of services, the need to strengthen the gender machinery, including the consideration of establishing a women's ministry (dedicated to women only), and the creation of a special fund to support poverty eradication (Xingwana, 2010, pp. 15-16).

Dimension 5: Access to Resources

Ownership rights are critical to securing a sustainable livelihood and income, and the lack of these rights is one of the main sources of women's economic insecurity. When women own and control resources and family assets, they have increased decision-making power in the household and are more likely to allocate resources to support the welfare of all family members, including by reducing poverty and hunger (Stats SA, 2010a, p. 12). The government is therefore committed to advancing women's empowerment through the mainstreaming of gender in the implementation of the Land Reform (Labour Tenants) Act of 1996; Housing Act of 1997); Water Service Act of 1997; the Land Bank Amendment Act of 1998; and the Integrated Sustainable Development Programme (Xingwana, 2010, pp. 19-20).

Targets have been determined to increase the proportion of women who own land, to 30% by 2015, as well as to increase the proportion of women accessing credit, to 40% by 2015. The percentage of land owned by women from 1994 to December 2007 in South Africa was 13.29% following the implementation of land reform processes in the country. During the fiscal year 2009-2010, a total of 5˚681 females were beneficiaries of the redistribution and

land tenure reform programme. In terms of the land restitution programme, of the 9˚294 households making up 48˚233 beneficiaries that benefitted from the programme, 4˚177 were female headed households (MWCPD, 2010b, p. 26).

In terms of access to finances for small businesses (Table 21), female small business owners are significantly more likely to be financially excluded than their male counterparts (43.7% of female business owners vs. 39.2% of male business owners). Moreover, female small business owners are significantly less likely to be banked (43.1% females banked vs. 52.1% males banked) (FinScope, 2010, p. 5)

Table 21: Access to financial services by male and female small business owners, 2010

	Formal		Informal	Not served
	Banked	Other formal		
Male	52.1%	3.4%	5.2%	39.2%
Female	43.1%	5.5%	7.7%	43.7%

Source: FinScope (2010, p. 5)
Note: *Formally served/included* – individuals who have/use financial products provided by formal financial institutions (i.e. financial institutions regulated by an act of law). There are two categories:

- *Banked* – individuals who have/use financial products provided by commercial banks
- *Other formal* – individuals who have/use financial products provided by formal financial institutions which are not commercial banks (e.g. insurance companies, microfinance institutions, credit-providing retail stores)

Informally served/included – individuals who have/use financial products which are not provided by a formal financial institution (e.g. savings with a savings group, credit from a private moneylender, burial society membership)
Financially unserved/excluded – individuals who do not have/use financial products – neither formal nor informal. These individuals typically save by keeping money at home, and borrow only from friends and family

In terms of ownership of dwellings, based on findings from the 2010 General Household Survey, households run by black African women appear to the most likely to be owned by the head of household and also fully paid off (72%, in Table 22). A high figure also applies to female Indian household (64%). However, the role of customary practices needs to be explored in this phenomenon. Also, the nature of the dwellings needs to be taken into consideration, as respectively 10% and 14% of all dwellings that are owned and paid off are either informal dwellings/shacks or traditional dwellings/huts/structures made of traditional materials. Nevertheless, houses that are fully paid off, for all racial groups, are rather female-headed than male-headed. Possible explanations include instances where the wife inherited the dwelling from a deceased husband, fully paid due to life insurance coverage, or where the dwelling was passed down through generations.

Table 22: Percentage (%) of heads of households that own their dwellings, by sex and race of household head, 2010

Sex and race of household head	Category of ownership			Total owned
	Owned, but not yet paid off to bank /financial institution	Owned, but not yet paid off to private lender	Owned and fully paid off	
Black African male-headed households	4%	1%	56%	61%
Black African female-headed households	2%	1%	72%	75%
Coloured male-headed households	19%	2%	42%	63%
Coloured female-headed households	8%	2%	50%	60%
Indian male-headed households	25%	5%	42%	73%
Indian female-headed households	12%	2%	64%	79%
White male-headed households	26%	4%	44%	74%
White female-headed households	15%	2%	47%	64%
All male-headed households	9%	1%	53%	63%
All female-headed households	4%	1%	69%	74%

Source: Calculated from Stats SA (2011a, Table 9.6, p. 101)

With regard to women's access to information technology, Research ICT Africa (RIA) conducted a Household and Individual Access and Usage Survey that provided valuable information. The study was conducted the study among both urban and rural residents in South Africa, covering among others the extent of cell phone and internet use (Gillwald, Milek & Stork, 2010). As can be seen in Table 23, women have greater access to cell phones than men (65% versus 58%). However, in terms of internet use the trend is reversed as only 11.3% of women use the internet compared to 20.4% of men. In the case of South Africa, men and women both had access to the Internet largely through their place of work, though a few had access at home, with business people also having mobile access either on their mobile phones or laptops. In the case of the urban, mixed gender focus group, the business person with these multiple access points was a man (Gillwald, Milek & Stork, 2010, p. 19).

Table 23: Access to/use of mobile phone and the Internet, by sex (2007/08)

	Share of people (16+) with mobile phone or active SIM card	Share of people (16+) that know what the Internet is	Share of people (16+) that use Internet	Share of people (16+) with email address
Men	58%	56.2%	20.4%	16.9%
Women	65%	47.0%	11.3%	9.6%
Both sexes	62%	50.8%	15.0%	12.6%

Source: Gillwald, Milek & Stork (2010, Table 6, p. 12 & Table 10, p. 19)

Other sources, e.g. figures calculated from the General Household Survey (Stats SA, 2010a) also confirm high ownership of cell phones in South Africa. However, in Table 24 the unit of analysis is not the individual anymore but the head of household. Thus, if 88% of African female-headed households, for instance, reported access to a cell phone it can be because of a male member of the household that owns such a phone. Nevertheless, the table is interesting as it shows high levels of access to cell phones in every household in the country. On the other hand, household access to a cell phone does not allow for the same uses and

opportunities as individual ownership of a cell phone, especially as far as the conduct of business is concerned.

Table 24: Percentage (%) of households that own a cellular phone and a landline phone connection, by sex and race of household head, 2010

Sex and race of household head	Cellular phone	Landline phone
African male-headed households	86%	6%
African female-headed households	88%	5%
Coloured male-headed households	83%	33%
Coloured female-headed households	79%	28%
Indian male-headed households	96%	66%
Indian female-headed households	89%	73%
White male-headed households	98%	71%
White female-headed households	90%	72%
All male-headed households	88%	20%
All female-headed households	88%	13%

Source: Calculated from Stats SA (2011a, Table 11.1, p. 115 & Table 11.3, p. 117)

Moreover, women, on average, spend about 31% of their monthly disposable income on cell phone expenses compared to 27% spent by men, according to Gillwald, Milek and Stork (2010, p. 15). Focus groups discussions indicate that the women in their study largely paid for their phone usage from whatever income they received. Cell phone expenses therefore impact on the household and food budget, but many women indicated that they primarily receive calls or make “missed calls” for people to return the call (Gillwald, Milek & Stork, 2010, p. 16).

The lack of the use of internet service by especially women in rural and low-income regions was also confirmed in research by Jiyane and Mostert (2010). They conducted a study on the use of information and communication technologies by 42 women hawkers and vendors in KwaZulu-Natal. Information was gathered through observation and interviews. The majority of women in the study possessed mobile phones, and other ICT used included landlines, radio and television. Computer technology, however, was absent, although the sampled women displayed a keen interest in its use. All of the surveyed women used radio and TV to listen to and watch business-related programmes, and almost all of them used cell and land phones to make and receive calls to and from business partners, retail stores, product suppliers and distributors. However, none used ICT to search for business related information.

Access to transport is a key indicator in social, political and economic development, as it is not simply about mobility and infrastructure, but also about socio-cultural roles and responsibilities that impede the development of women and girls. One of the reasons for transport being important for the development of women in rural areas is that it has impact on women and children accessing health services, educational facilities and employment, as well as participating in key decision-making forums (DoT, 2008, p. 34). For instance, in South Africa, lack of transport to ensure the timely transfer of women between institutions accounted for 13.6% of maternal deaths in 1998, and the figure does not include delays in transporting women from their homes to institutions (IDS, no date, p. 5, quoting a study by Hall, Du Plessis & McCoy, 2002).

The Department of Transport, in its Rural Transport Strategy for the country, recognises the need for significantly enhanced participation by women in both the planning and the delivery of rural transportation (DoT, 2007, p. 50). Transport can improve the lives of women by

reducing the amount of time they spend on household activities. As women carry out most of household transport, a higher rate of bicycle use could reduce their workload significantly and help to prevent some unhealthy effects (DoT, 2008, p. 34).

The importance of transport in the lives of women is also evident in the fact that transport accounts for about 16% of the total annual household consumption expenditure of female-headed households (Table 25). About 4% is spent on transport services by road which is more than the 2.5% in the case of male-headed households.

Table 25: Percentage of annual household consumption expenditure spent on transport, by sex of household head, 2005/06

	Female-headed households	Male-headed households
Transport	**16.3%**	**21.3%**
Purchase of vehicles	8.4%	12.6%
Operation of personal transport equipment (parts, accessories, maintenance etc.)	3.4%	5.6%
Transport services by rail	0.2%	0.2%
Transport services by road	4.1%	2.5%
Transport services by air	0.2%	0.3%

Source: Stats SA (2008, Table 2.5, p. 56 & Table 2.6, p. 60)

Additional analyses show that the three provinces in the country with the lowest shares of black African women (Western Cape, Northern Cape and Gauteng) are also the three provinces with the highest proportions of car users (Table 26). This, to some degree, points to the gendered nature of access to modes of transport but finer breakdowns (by urban/rural sub-regions) are required to make informed conclusions.

Table 26: Transport modes by province, together with shares of women per province, 2003

Province	Percentage of people in province using transport mode during 7 days prior to day of data collection							% women in province	% Black African women in province
	Train	Bus	Metered taxi	Minibus taxi	Sedan taxi	Bakkie taxi	Car		
Western Cape	7.6%	4.6%	1.2%	19.6%	0.8%	1.2%	29.9%	51%	16%
Eastern Cape	0.7%	3.3%	0.5%	15.9%	1.2%	4.9%	8.6%	51%	46%
Northern Cape	0.3%	2.2%	0.4%	12.7%	0.4%	0.9%	16.1%	52%	29%
Free State	0.2%	3.3%	0.9%	22.5%	1.5%	0.6%	12.6%	52%	45%
KwaZulu-Natal	1.1%	8.7%	1.6%	20.5%	0.9%	2.8%	11.2%	53%	46%
North West	1.1%	6.7%	1.0%	22.7%	0.4%	0.7%	11.9%	50%	45%
Gauteng	5.7%	3.7%	1.6%	31.8%	0.7%	1.1%	25.0%	50%	37%
Mpumalanga	0.2%	8.1%	1.0%	19.7%	1.0%	1.1%	11.8%	52%	48%
Limpopo Province	0.1%	5.6%	0.6%	17.7%	0.3%	0.7%	7.7%	53%	52%
Total SA	2.3%	5.5%	1.1%	21.7%	0.8%	1.9%	15.3%	52%	41%

Source: DoT (2003, Table 11, p. 10); Stats SA (2011a, Table 1.1, p. 49)

Furthermore, women entrepreneurs continuously face a wide array of obstacles and barriers in their business operations with regard to transport. The establishment of the South African Network for Women in Transport (SANWIT) is a reaction to these challenges. SANWIT is an association of women who support the idea of strengthening the role of women in transport. The network is aimed at recruiting women or women groups as members and co-ordinate them into the SANWIT umbrella body. One of the main goals of SANWIT is to facilitate regional networking among women on critical issues in transport for development. The SANWIT concept promotes collaboration and coalition building among women entrepreneurs for policy advocacy and action, which recognizes and support women's contribution in transportation development (www.transport.gov.za/content_main.aspx?menuId=34)

The Zibambele road maintenance contract system is an example of good practice of how transport can make a difference in the life of rural poor. It is an initiative of the KwaZulu-Natal Department of Transport that creates job opportunities for poor rural families through the maintenance of rural roads (www.kzntransport.gov.za/programmes/zibambele/index.htm). The programme contracts a household rather than an individual to maintain a length of road, thereby ensuring that the household does not rely on any person for continuity of the contract. Women-headed households are targeted because they make up the majority of the poorest families. Training includes technical skills on the correct way to maintain roads as well as a social development and life skills component. Support services to contacted households include assisting them to obtain identity documents, open bank accounts, organise themselves collectively into credit unions and assisting people to invest savings in other productive activities.

In terms of electricity access it first needs to be mentioned that South Africa has an Integrated National Electrification Programme that has only come into effect since 2005. During the 1990s the dominant planning assumption was that 80% of households would be electrified by 2012. In the president's State of the Nation Address in 2004, however, the target was changed to universal access (i.e. 100%) by 2012. Estimates of the proportion of total households in South Africa with access to electricity vary quite widely. For instance, for 2008 the figures seem to range from around 64% to over 80%. Irrespective of the appropriate figure of access the conclusion remains the same: access to electricity by 100% of South Africa's households by 2013 is practically impossible (Bekker et al., 2008, pp. 3119-3120).

Table 27 shows, for each province, the percentage of households with access to electricity from the mains, as well as the shares of female households in those provinces. The three provinces with the lowest access to electricity – Limpopo Province (47%), Eastern Cape (54%) and Mpumalanga (62%) – also reported high proportions of households that are headed by female black Africans. Thus, there appears to be some evidence that black female heads of households are most affected in instances where there is a lack of access to electricity. However, a finer breakdown in terms of district or local authority – as opposed to the current provincial breakdown – would have provided clearer evidence of the extent to which female-headed households are affected by the lack of access to electricity.

Table 27: Female-headed households and access to electricity, by province, 2008/09

Province	% of households with access to electricity from mains, for cooking	% female-headed households in province	% Black African female-headed households in province
Western Cape	85%	51%	14%
Eastern Cape	54%	52%	45%
Northern Cape	78%	54%	29%
Free State	85%	53%	46%
KwaZulu-Natal	68%	53%	46%
North West	70%	51%	46%
Gauteng	84%	50%	38%
Mpumalanga	62%	51%	48%
Limpopo Province	47%	54%	52%
Total SA	71%	52%	41%

Source: Stats SA (2011a, Table 12.2.1, p. 120); Stats SA (2011b, Table 1.1, p. 63)

Nevertheless, a study by Dinkelman (2010), with regard to the effects of rural electrification on employment in South Africa, has found that electrification significantly raises female employment within 5 years. The new infrastructure appears to increase hours of work for men and women, while reducing female wages and increasing male earnings. Evidence suggests that household electrification raises employment by releasing women from home production and enabling micro-enterprises.

Dimension 6: Women's Agency

Table 28 on the next page summarises the representation of women in various South African agencies. In 1994, immediately after the first democratic elections in South Africa, the representation of women in the National Assembly (or lower house of parliament) stood at 25%. In 2009 this figure was 44%. The marked increase between 2004 and 2009 is a result of the shift in policy by the African National Congress (ANC), the ruling party in government. In the previous election cycles, the ANC ensured that at least every third person on the party list was a woman. During the 2009 elections women accounted for 50% of nominees on the party list (MWCPD, 2010b, p. 19).

Table 28: Share (%) of women in various South African agencies

	Percentage	Relevant year(s)
Share of women in lower house of parliament	44%	2009
Share of women in upper house of parliament	30%	2009
Share of women among ministers	45%	2008
Share of women among premiers of provinces	55%	2010
Share of women among mayors	16%	2003-2009
Share of women among elected councilors at local government	40%	2010
Share of women among ambassadors, high commissioners and consul-generals	22%	2010
Share of women among judges	19%	2009
Share of women among magistrates	33%	2009
Share of women in the National Executive Committee of the African National Congress (ANC), the ruling party	50%	2011
Share of women among the national and provincial leaders of the Democratic Alliance (DA), the official opposition	41%	2011
Share of women among national leadership of the Congress of South African Trade Unions (COSATU)	45%	2005

Sources: Moqhadam, Franzway & Fonow (2011, Table 12.1%; p. 248); MWCPD (2010b, p. 21 & p. 22); UN (2010, Table 5.A, p. 219); websites of the ANC and DA.

In 2008, 45% of ministers were female, which decreased to 41% in 2009, as evident in Table 29 below. Female ministers have not been confined to ministerial positions in the social sector only, but have been appointed into areas such as Defence, International Relations and Cooperation, Energy, Water Affairs, Correctional Services, Mining, Public Enterprises, Science and Technology and Home Affairs – areas which are generally stereotyped as male dominated sectors. In fact South Africa has been rated sixth on the Global Gender Gap Index 2009 by the World Economic Forum, only behind Iceland, Finland, Norway, Sweden and New Zealand and up fourteen positions from its rating in 2008 (MWCPD, 2010b, p. 21).

Table 29: Share (%) of women among ministers and deputy-ministers in the cabinet, 1994-2009

	1994	1996	2003	2004	2009
Ministers	11%	16%	31%	48%	41%
Deputy-ministers	25%	62%	50%	50%	39%

Source: MWCPD (2010b, p. 20)

Another set of figures on the representation of women in the South African parliament is one whereby their share has increased from 27.8% in 1994 to 43.3% in 2009 (Stats SA, 2010a, p. 57), here replicated as Table 30. Even the province that displayed the lowest representation in 1994, namely KZN with 13.6% representation, stood at 37.5% in 2009. Indeed, in the 2009 elections, all provinces met the SADC 1997 Gender and Development commitment of ensuring women in politics and decision making representative target of 30%. There however is clamour from civil society for an even better representation at 50%. Those voices want that 50% gender representation to be enshrined in legislation (Presidency, 2010, p. 55).

Table 30: Share (%) of women members of parliament and provincial legislatures in South Africa, by year of national and provincial election

	1994	1999	2004	2009
Parliament	27.8%	30.0%	32.8%	43.3%
Provincial legislatures				
Eastern Cape	23.2%	23.8%	33.3%	44.4%
Free state	23.3%	23.3%	26.7%	40.0%
Gauteng	29.1%	35.6%	42.5%	45.2%
KwaZulu-Natal	13.6%	27.5%	26.3%	37.5%
Limpopo	27.5%	32.7%	32.7%	46.9%
Mpumalanga	20.0%	26.7%	30.0%	40.0%
North West	27.3%	27.3%	33.3%	42.4%
Northern Cape	23.3%	26.7%	30.0%	43.3%
Western Cape	23.8%	26.2%	31.0%	33.3%
Total	**25.4%**	**29.2%**	**32.5%**	**42.4%**

Source: Presidency (2010, p. 55)

The representation of women in provincial legislatures has increased from 25.4% to 42.4% respectively. Local government is also showing improved performance; after the 2006 local government elections, female representation in local government councils was at 40%. One reason for this, as said before, is the fact that the ANC increased their quota of women on the party list from 33% to 50% (Stats SA, 2010a, p. 57).

In the ANC, the National Executive Committee (NEC) is the highest organ and has the authority to lead the organisation, subject to the provisions of the party's constitution. According to its constitution, the NEC, as a whole, shall not consist of less than 50% of women (www.anc.org.za/show.php?id=4769). Many women's groups in South Africa have pushed for greater mainstreaming of women's representation in leadership positions in political parties. Therefore while the country's constitution does not mandate quotas, its proportional representation list system allowed the parties (in particular the ruling ANC) to address issues of equity in representation, not only for women but also for other minorities. The fact that the ANC has pledged its own quota system, currently promoting a policy of a 50/50 split representation for women and men, has had an impact on some of the opposition parties. Some have also pledged to increase women's representation in their structures, even though many of them, like the DA, have resisted setting explicit quotas to achieve this (Ahikire, 2009, pp. 6-7).

During the most recent local government elections, conducted in May 2011, the ANC continued to lead by fielding the highest number of women candidates for these elections. Altogether 47% of the 9˚409 candidates representing the ANC were women. In the case of the DA, the official opposition, women comprised 33% of the 7120 DA candidates (MWCPD, 2011b).

However, the Commission for Gender Equality examined the election manifestos of the ANC, COPE, DA, IFP, and the UDM in the 2011 local elections, to assess any commitments to gender equality. They found that in the main, parties have not mainstreamed gender throughout their proposed interventions. The focus of most manifestos is on service delivery issues, but no gender lens has been applied to these, or specific reference made to their proposed impact on women (Hicks, 2011).

In the Congress of South African Trade Unions (COSATU), the umbrella body of trade unions, women in leadership positions are still treated with suspicion, according to the union's deputy director general, Bheki Ntshalintshali (IOL News, 2011). He also expressed concern about the fact that some male members had openly announced that they would not accept a woman as leader, and that he trade union is haunted by the so-called "deputy syndrome". The latter implies that women do not really advance in the organisation other than deputising under men.

Another aspect of women's agency is their ability to control and make choices regarding their reproduction. Choices concerning contraceptive use are an indicator in this regard. The United Nations reports a contraceptive prevalence figure of 56% for the period 2000 to 2008 (UN, 2010, table 2.A, p. 184).

Moreover, in the national HIV communication survey by Shisana et al. (2009) there has been a dramatic increase in the number of people reporting using condoms at last sex. Improvements occurred for both sexes in all age groups. The increases among women are particularly remarkable as women traditionally had low rates of reported condom use. Apart from the highly successful condom promotion and distribution system developed by government, the improvement seen in condom use at last sex among females may also indicate that females are becoming more empowered to negotiate condom use. One possible explanation of the findings, according to Shisana et al. (2009, p. 66) is that not only might there have been a shift in the levels of condom negotiating skills, but also an increased openness in the community to discuss sex and condoms among youth.

Table 31: Condom use at last sex by age group and sex, 2002-2005

	2002	2005	2008
15-24 years			
Men	57.1%	72.8%	87.4%
Women	46.1%	55.7%	73.1%
25-49 years			
Men	26.7%	35.3%	56.4%
Women	19.7%	29.1%	58.1%
>50 years			
Men	8.2%	8.6%	39.9%
Women	5.6%	5.3%	25.9%

Source: Shisana et al. (2009, Figure 3.7, p. 45).

Lastly, the Choice on Termination of Pregnancy Act was passed by the National Parliament in 1996 which enabled women to have access to legal and safe terminations (MWCPD, 2010b, p.5).

Dimension 7: Opportunity and Capability

The South African Schools Act of 1996 makes schooling compulsory for learners from the beginning of the year they turn seven years old to the end of the year they turn 15 years old or up to the ninth grade, whichever occurs first. Nine years of compulsory schooling includes all seven years of primary schooling and two of the five years of secondary schooling. Grades R to 9 are part of the general education band. The remaining three years of secondary schooling (Grades 10 to 12) form part of further education. Although further

education is not compulsory, the South African constitution obliges the government to make it progressively accessible and available (MWCPD, 2010b, p. 27).

Under the former apartheid system, white South African children received quality schooling virtually for free, while their black counterparts had only "Bantu education". The post-apartheid government is in particular targeting education for the poorest of the poor, with two notable programmes. One is fee-free schools, i.e. institutions that receive all their required funding from the state and so do not have to charge school fees. These have been carefully identified in the country's most poverty-stricken areas. The other is the National Schools Nutrition Programme, which feeds about millions of schoolchildren in poverty-stricken areas every day (www.southafrica.info/about/education/education.htm).

In 2008 the Department of Education launched the Khai Ri Gude mass literacy campaign, with the intention of enabling 4.7 million adults above the age of 15 years to become literate and numerate in one of the eleven official languages. The goal is to halve the country's illiteracy rates by 2015. The campaign enables adult learners in all nine provinces to read, write and calculate in their mother tongue, and also to learn spoken English. The training materials involve the teaching of reading, writing and numeracy, and also integrate themes and life skills such as health, gender, the environment and civic education. The materials have been adapted for use in Braille in eleven languages, and for use by the deaf. Currently 80% of the learners are women (www.kharigude.co.za).

In order to measure literacy rates in South Africa, level of education attained is used as a proxy for literacy. A person is defined as totally illiterate if he/she has received no formal education. It does not take into account people who become literate through literacy programmes. In 2009, according to Table 32 which uses this definition, 79% of women were literature compared to 82% of men (DBE, 2011b, pp. 57-58).

Table 32: Adult literacy rates among the population age 20 tears and older, by sex, 2002-2009

Year	Women	Men
2002	69.4%	72.4%
2003	70.3%	75.3%
2004	71.8%	75.0%
2005	72.1%	76.6%
2006	73.3%	78.0%
2007	75.6%	77.9%
2008	75.3%	78.9%
2009	78.8%	81.6%

Source: DBE (2011b, Table 9, p. 58)

The United Nations, in its World's Women 2010 report, provides different adult literacy figures for South African men and women, namely 90% for men and 88% for women. These are substantially higher than those reported in Table 32, because the United Nations uses "15 years and over" as criterion to define an adult and not "20 years and over" as is the case in domestic reports.

Table 33: Adult literacy rate and primary, secondary and tertiary enrolment rates, by sex

	Adult literacy rate, 2005-2008	Primary net enrolment rate, 2000-2007	Secondary net enrolment rate, 2000-2007	Tertiary gross enrolment rate, 2000-2007
Male	90%	86%	71%	14%
Female	88%	86%	76%	17%

Source: UN (2010, Table 3.A, p. 190 & Table 3.B, p. 196)

Note: Adult literacy rate = Percentage of the population aged 15 years and over who can read and write with understanding a simple statement related to their daily life
Primary net enrolment rate = The number of children of official primary school age who are enrolled in primary education as a percentage of the total number of children of official primary school age
Secondary net enrolment rate = The number of children of official secondary school age who are enrolled in secondary education as a percentage of the total number of children of official secondary school age.
Tertiary gross enrolment ratio: The total enrolment in tertiary education, regardless of age, expressed as a percentage of the five-year age group population following secondary school leaving.

Table 33 also includes sex-based enrolment rates for the primary, secondary and tertiary stages of education. Among primary school learners there is no difference in the total enrolment of boys and girls but differences do exist for secondary and tertiary education where the female proportions are higher than those of males.

An inspection of the gender parity indexes (GPI) for primary and secondary school enrolments, by year, provides additional insights. Between 1997 and 2009 learner enrolment at the primary school level was more or less equitably distributed between female and male learners, with a slight male advantage. By contrast, throughout the reporting period, the secondary-level GPI reflected a female advantage, which has been decreasing. The apparent male advantage in primary reflects greater male repetition, which eventually contributes to greater male drop-out rates in secondary schools, which is why the GPI favours females by the time the learners reach secondary school level (MWCPD, 2010b, p.˚28).

Table 34: Gender parity index (GPI) by level of education, 1997-2009

	1997	1999	2001	2003	2005	2007	2009
Primary	0.97	0.97	0.96	0.95	0.96	0.97	0.98
Secondary	1.16	1.14	1.12	1.08	1.08	1.06	1.01
Total	1.03	1.02	1.01	0.99	1.00	1.01	1.02

Source: MWCPD (2010b, p. 28).

The gender parity index is based on the ratio of the gross enrolment rate (GER) of female learners to that of male learners. A value of 1 indicates gender parity, i.e. similar GERs for both sexes. A value of less than 1 indicates a male advantage and a value above 1 a female advantage.

The apparent male advantage at primary school-level is also reflected in Table 35 below, together with the corresponding female advantage at secondary school-level. In addition, Table 36 clearly shows greater male repetition at primary school-level (Grades 1 to 7) and even during the first three years of secondary education (Grades 8 to 10). Grades 1 to 9 represent the compulsory component of school education, which corresponds to the general education band, and Grades 10 to 12 the further education band. It appears that after Grade 10 many male repeaters have dropped out, thereby resulting in higher repetition rates for girls during Grades 11 and 12.

Table 35: Sex distribution (%) of primary and secondary grade learners in South Africa, 2009

	Primary grade	Secondary grade
Male	51.3%	48.4%
Female	48.7%	51.6%
Total	100%	100%

Source: DBE (2010), calculated from Table 5, p. 11

Table 36: Percentage of repeaters at South African schools, by grade and sex, 2009

Grade	% of female repeaters	% of male repeaters
Grade 1	6.1%	8.2%
Grade 2	6.5%	8.3%
Grade 3	4.3%	10.4%
Grade 4	5.3%	8.7%
Grade 5	4.6%	9.0%
Grade 6	5.7%	7.7%
Grade 7	4.4%	5.7%
Grade 8	6.4%	10.4%
Grade 9	9.0%	12.3%
Grade 10	15.7%	18.7%
Grade 11	16.5%	15.9%
Grade 12	9.2%	6.9%
Total	7.7%	10.2%

Source: DBE (2011b, Table 4, p. 36)

The reasons for grade repetition among girls are to some extent the same as those for girls but there are also gender-specific differences. Many girl children from indigent households miss more than 40 days of learning each academic year because of lack of access to sanitary towels. The government therefore recently launched the Sanitary Dignity Campaign through which the state seeks to mobilize resources for delivery of sanitary towels to these learners, indigent women and children with disabilities (Xingwana, 2011a, p. 12).

Moreover, an analysis of the main reasons why children of school-going age are not in school indicates that poverty (lack of money for fees) is the main reason for both sexes. Pregnancy and family commitments also set girls apart from boys. Given that an uundesirable number of girls continue to drop out of school due to poverty and pregnancy, the government acknowledges the urgency to tackle the primary causes of teenage pregnancy and entrenched poverty (Stats SA, 2010a, p. 49).

Table 37: Main reason why 7 to 18 year olds are not in school, by sex, 2003

Reason	Female	Male
No money for fees	40.8%	39.3%
Pregnancy	9.8%	0.3%
Family commitment	8.2%	0.4%
Illness	7.5%	8.7%
Too old/young	7.3%	9.8%
Education is useless/uninteresting	6.5%	13.5%
Completed school/education	3.5%	4.7%
Working at home or job	3.2%	5.9%
Failed exams	2.9%	5.5%

Source: DoE (2006b, Figure 38, p. 54)

However, pregnant learners cannot be denied their constitutional right to education because of pregnancy, as the South African constitution criminalizes discrimination on the basis of pregnancy, which means that. Also, in 2007, the Measures for the Prevention and Management of Learner Pregnancy was released, which have been widely distributed to schools. The document provides a framework for: (i) ensuring that learners are fully informed about reproductive matters and have the information that assists them in making decisions; (ii) informing affected learners about their rights to education; and (iii) supporting teachers in managing the effects of learner pregnancy in schools (MWCPD, 2010b, p. 30).

On the issue of subject choice at the further education band, the National Curriculum Statement requires all learners in Grades 10 to 12 to do seven subjects of which four are compulsory and three are of their own choice. Two of the compulsory subjects must be South African languages. Of these, one must be the language of teaching and learning, referred to as the home language, and the other, a first additional language. In addition to two languages, all learners must take either mathematics or mathematical literacy and life orientation. Apart from the four compulsory subjects, learners must choose an additional three subjects from an approved subject list. Learners can take up to four languages as part of their seven-subject package. Some of the approved subjects have been classified as designated subjects, which are more suitable for tertiary study (www.pacecareers.com).

In order to receive the National Senior Certificate (NSC), which is the school-leaving certificated granted at the end of Grade 12 after sitting through a national examination, the following minimum requirements apply:

Four compulsory subjects:

- Obtain at least 40% in the home language
- Obtain at least 30% in the other required language
- Obtain at least 30% in mathematics or mathematical literacy
- Obtain at least 40% in life orientationThree additional choice subjects:
- Obtain at least 40% in one of the subjects
- Obtain at least 30% in the other two subjects

Table 38 shows the percentages of learners who achieved at least 40% in each of a number of subjects, including mathematics and physical sciences. The corresponding percentages for the latter two subjects are extremely low, and not only have the figures for physical science decreased between 2008 and 2009, but are also worse for girls than for boys. It is from this small pool of candidates with at least 40% in these two subjects that the future scientists in SET are supposed to come from!

Table 38: Percentage of NSC candidates (Grade 12) who obtained 40% and above, by subject and sex, 2008 and 2009

Subject	% of female candidates who achieved 40% and above		% of male candidates who achieved 40% and above	
	2008	2009	2008	2009
Accounting	31.4%	35.8%	31.2%	36.3%
Business studies	43.2%	47.1%	42.1%	46.2%
History	37.8%	46.9%	37.5%	46.9%
Life orientation	96.7%	98.7%	95.8%	98.3%
Life sciences	41.1%	40.5%	37.8%	39.1%
Mathematics	27.2%	26.3%	33.4%	33.0%
Mathematical literacy	53.0%	48.4%	57.3%	54.3%
Physical sciences	26.6%	18.5%	30.8%	22.8%

Source: DBE (2010, Table 14, p. 26)

Note: The National Senior Certificate or NSC is the equivalent of a high school diploma and is the school-leaving certificate in South Africa, obtained after successful completion of the national examination for Grade 12. This certificate is commonly known as the matriculant (matric) certificate, as Grade 12 is known as the matriculation grade.

On a positive note, a number of initiatives have been introduced to increase the performance of girls in mathematics and physical science, with the objective of their eventual entry into SET tertiary studies and careers.

South Africa has been promoting girls' in the areas of mathematics and science through the establishment of Dinaledi schools. The Dinaledi schools project aims to increasing access to mathematics and science at higher-grade level in underprivileged schools, by providing these schools and the teachers involved specialised support at district level (Mayende-Sibiya, 2010). Already there are indication of success as Dinaledi learners, for instance, accounted for 32% of the total number of learners who achieved more than 50% for mathematics in the 2010 NSC (www.southafrica.info/about/education/dinaledi-161007.htm; http://allafrica.com/stories/201103290140.html).

South Africa also has a dedicated S&T programme for girls, called Techno Girls, which is a partnership between the government, UNICEF and the private sector, with an exclusive focus on careers in the fields of mathematics, science and technology. At the start of 2011, the programme already supported more than 4˚500 girls from four provinces to study mathematics and science and to pursue careers in science and technology. The programme targets dedicated grade 9-12 learners from disadvantaged communities. During the school holidays, the girls are placed in various companies, job shadowing business leaders to gain first hand insight into the running big corporate and career choices available. In February 2011 the Minister for Women, Children and People with Disabilities, Ms Lulu Xingwana announced that the programme will be expanded to the remaining provinces to increase the number of girls enrolled. Moreover, according to the minister, already 20 participants of the programme graduated with university degrees in different fields of science and engineering related to the mining industry. These girls were awarded scholarships from the mining industry as a result of the job shadowing programme (MWCPD, 2011a).

The Department of Education also receives donor funds from Carnegie for its Carnegie-SA Undergraduate Women's Scholarship Programme. The aim of the Carnegie-South Africa Undergraduate Women's Scholarship Programme is to contribute to an increase in the participation, success and graduation rates of women students in higher education, by providing full-cost scholarships to 150 female students. There is a particular focus on studies in the scarce skills fields and areas where females are under-represented. The majority of students have completed their studies and are employed in the fields of health care, education, science, engineering, banking and investment and the petro-chemical industry (DoE, 2010a, p.190).

Turning to skills development in general, the skills of the South African workforce are at the heart of the National Skill Development Strategy (NSDS). The NSDS aims to exploit the workplace as an active learning environment, to promote self-employment, and to secure work opportunities for new entrants into the labour market. These aims are supported by a policy framework which includes various acts and strategies related to skills development (Paterson, Visser & Du Toit, 2008, pp 1-2). In March 2000, the Minister of Labour formally established 23 Sector Training and Education Authorities (SETAs), each with its own clearly defined sector and sub-sector. The SETAs were concerned with learnerships, internships, unit-based skills programmes and apprenticeships. One of the primary objectives of the SETAs was to collect skills levies from employers within each sector, in terms of the Skills Development Levies Act, and making the money available within the sector for education and training. Up to 2009 these SETAs were controlled by the Department of Labour. In 2009, with

the establishment of the Department of Higher Education and Training, it was announced that the latter would assume responsibility for skills development. In April 2010 a draft for a new skills development strategy was announced, to be implemented between 2011 and 2016. Essentially, the SETAS have been reduced from 23 to 21, with 15 of the existing ones being rectified with minor changes and six new SETAs being created as a result of the amalgamation of existing ones (www.vocational.co.za).

The results of the last two National Skills Surveys, prior to these changes, show that the distribution of training according to gender significantly changed with time in private enterprises (Table 39). In 2002/03, 22% of females and 28% of males in such enterprises received training. Four years later, in 2006/07, 56% of females received training as opposed to 51% of males. This meant that the NSDS equity target of 54% females trained was exceeded for the year 2006/07. Moreover, although all enterprise size groups experienced higher training rates, the magnitude of the increase rose with enterprise size, with small enterprises experiencing the smallest increment and large enterprises the largest increment. Simultaneously, the differential in training rates between males and females increased with enterprise size, with males and females in large enterprises respectively experiencing a 31% (from 30% to 61%) and a 49% (from 20% to 69%) increase in training between the two survey years. Women in large enterprises were therefore by far the biggest beneficiaries of access to training in 2006/07 (Paterson, Visser & Du Toit, 2008, p. 53).

Table 39: Distribution of skills training in the private sector, by sex and enterprise size, 2002/03 and 2006/07

	2002/03				2006/07			
	Small	Medium	Large	Total	Small	Medium	Large	Total
Male	21%	27%	30%	28%	34%	41%	61%	51%
Female	23%	26%	20%	22%	35%	48%	69%	56%
Total	22%	27%	26%	25%	34%	43%	64%	53%

Source: Paterson, Visser & Du Toit (2008, Table 3.36, p. 53)

In terms of occupation category, the 2006/07 National Skills Survey revealed noticeably higher training shares for women in the high skill managerial, professional and technical occupations, but noticeably lower shares in the community and sales occupations. For instance, 71% of all female professionals in private enterprises received skills training compared to 56% of male professionals. Thus, in 2006/07 improved training access was concentrated mainly on high skill female managerial, professional and technical workers (Paterson, Visser & Du Toit, 2008, p. 54).

Table 40: Distribution of skills training in the private sector, by sex and occupational category, 2006/07

Occupational category	Female	Male
Manager	59%	49%
Professionals	71%	56%
Technicians & trade workers	76%	59%
Community & personal service workers	34%	50%
Clerical & administrative workers	54%	56%
Sales workers	50%	62%
Machinery operators and drivers	49%	50%
Labourers	55%	45%
Total	56%	51%

Source: Paterson, Visser & Du Toit (2008, Table 3.38, p. 54)

In the public sector women comprised about 50% (and sometimes even higher proportions) of government employees that participated in the specific category of "skills programmes and other short courses". Figures in this regard are included for 15 government departments in Table 41 below. There are however also notable exceptions, such as the Department of Defence that recorded only 23% of female beneficiaries of skills programmes and short courses. However, this is no anomaly as the employee division in the Department of Defence is about 73% male and 27% female (DoD, 2010).

Table 41: Sex distribution (%) of beneficiaries of skills programmes and other short courses for government employees, for 15 selected national government departments

Department	Female beneficiaries	Male beneficiaries	Reference year
Dept of Agriculture, Forestry & Fisheries	51%	50%	2010/11
Dept of Arts & Culture	56%	44%	2009/10
Dept of Basic Education	64%	36%	2010/11
Dept of Communications	65%	35%	2009/10
Dept of Defence	23%	77%	2009/10
Dept of Energy	61%	39%	2010/11
Dept of Health	50%	50%	2010/11
Dept of Home Affairs	59%	41%	2010/11
Dept of International Relations & Cooperation	65%	35%	2009/10
Dept of Justice & Constitutional Development	67%	23%	2010/11
Dept of Mineral Resources	56%	44%	2010/11
Dept of Public Enterprises	54%	46%	2009/10
Dept of Science & Technology	55%	45%	2010/11
Dept of Social Development	67%	23%	2010/11
Dept of Water Affairs	48%	52%	2010/11

Sources: DAC (2010, Table 11.2, p.179); DAFF (2011, Table 14.2, p. 206); DBE (2011a, Table 4.14.2, p. 218); DE (2011, Table 12.2, p. 223); DHA (2011, Table 12.2, p. 113); DIRCO (2010, Table 12.2, p. 36); DJCD (2011, Table 14.2, p. 226); DoC (2010, Table 12.2, p. 122); DoD (2010, Table 12.50, p. 111); DoH (2011a, Table 12.2, p. 272); DPE (2010, Table 12.2, p. 139); DMR (2011, Table 11.2, p. 215); DSD (2011, Table 12.2, p. 240); DST (2011a, p. 177); DWA (2011, Table 12.2, p. 252)

Lastly, the Department of Trade and Industry also manages the Bavumile Skills Development Initiative. The primary objective is to upgrade the basic skills of women with home-based enterprises to produce quality, commercially-viable, crafts and other culturally-based products. South African women are generally regarded as talented with regard to both designing and crafting fashionable products that reflect the country's cultures and heritage. However, one of their greatest challenges is to produce high quality products that will sell well anywhere in the world, and this is where the Bavumile initiative tries to be of value (dti, no date, pp. 6-7).

Dimension 8: Women in Knowledge Society Decision-making

According to the United Nations, the share of South African women as legislators, senior officials and managers, for the period 2004–2008, is 30% (UN, 2010, Table 4.B, p. 207). Another publication by the United Nations reports a figure of 34% for women legislators, senior officials and managers, expressed as percentage of the total (UNDP, 2009, p. 188, no date for figure).

While women constitute about 51% of the general population, they only constitute 22% of executive managers and about 16% of directors in various boards (Table 42). These figures apply to companies listed on the Johannesburg Stock Exchange (JSE). If South Africa does not make the necessary interventions, it may take the country 40 years to achieve 50/50 gender parity at executive management and board of directors level (Mayende-Sibiya, 2010). The Ministry for Women, Children and Persons with Disabilities is therefore very much concerned about poor representation of women in strategic and leadership positions, 17 years into the country's democracy.

Table 42: Female representation in top decision-making positions of JSE-listed companies and state-owned enterprises, by position, 2009-2011

Position	2008	2009	2010	2011
CEO / MD	3.9%	3.6%	4.5%	4.4%
Chairperson	3.9%	5.8%	6.0%	5.3%
Directorship	14.3%	14.6%	16.6%	15.8%
Executive manager	25.3%	18.6%	19.3%	21.6%

Source: BWA (2011); MWCPD (2010b, p. 24)

Note: JSE = Johannesburg Stock Exchange
Figures are supported by another study (GMI, 2009) that reports that the average percentage of women on the Board of Directors of 41 companies is 14.6%.

The same minister also made it clear that decisions concerning training investment are taken at executive management and board level. However, as it stands now, there is no indication of any deliberate effort to shift training resources in favour of women, especially in the private sector. Increased investment in skills development for women is thus required to enter into various economic areas (Mayende-Sibiya, 2010).

Still, women in decision-making positions in the public sector are better represented than is the case for women in the private sector. The Department of Labour, for instance, has implemented a Departmental Employment Equity (EE) Plan and progress in terms thereof is monitored. The Department has set itself the target of having 50% of women in senior management service (SMS) positions by 2015/16. Currently the figure stands at 33% (DoL, 2011b, p. 16).

Both the 1995 White Paper on Transformation of the Public Service and the 1998 White Paper on Affirmative Action provide equity targets for race, gender and disability representation within the public service. These minimum targets were 30% women in decision-making positions by 2005, which the public service had achieved by March 2006. Following the government's decision in November 2005, this target was reviewed to 50% women at all levels of the senior management service by March 2009. In order to fast track the attainment of the reviewed targets, given the tight time frames within which they are to be achieved, the government developed a Strategic Framework for Promoting Gender Equality within the public service workplace. This strategic approach includes a 8-Principle Action Plan for heads of department as an integral measure to fostering and facilitating a environment that is conducive towards achieving this goal. This action plan is aimed at encouraging senior government managers to ensure that a gender perspective is incorporated into all planning processes of government at all levels, it clearly outlines what each of the public service managers need to do to empower women in their respective departments. It is also aimed at empowering and increasing the resources that are targeted for the advancement of women in the public service (MWCPD, 2010b, pp. 22-23). The intention is that these actions become infused within the performance agreements of the heads of departments and director generals (Xingwana, 2011d, p. 3).

Figures pertaining to the representation of women in senior management positions in government are presented in Table 43 below.

Table 43: Representation of women in senior management positions in public service, December 2009

Position	Percent
Director-general	28%
Deputy director-general	35%
Chief director	34%
Director	37%
Total	36%

Source: MWCPD (2010b, Table 4, p. 23).

As noted, the government adopted in 2006 a target of 50% representation of women at all levels of decision-making in all spheres of government. The country is thus on track towards achieving this target and is clearly illustrated at both the executive and administrative levels in the country. However, the country still faces several challenges in meeting this target within the corporate and private sectors (MWCPD, 2010b, p. 19).

A more detailed comparison between the public and private sectors with regard to gender representation at the top and senior management levels is provided in Tables 46 and 47 at the end of this section. What makes these tables interesting is that the figures are disaggregated in terms of race, and figures also provided for promotions and new recruits into top and senior management. Black African men and to some extent also black African women occupy the majority of positions at the upper two management levels in government. In the private sector, however, these two positions are primarily filled by white men and to a lesser extent also by white women. Table 47 combines figures for the public and private sectors, which is why white men account for the larger shares of promotions and recruitments into the top and senior management levels. Separate figures for the public sector with regard to promotions and recruitments would probably have shown larger proportions of black African men in these two mobility categories.

The discussion will now shift to the representation of women in leadership in science institutions and higher education. The relevant figures, presented in Table 44, again show the general under-representation of women in leadership in S&T as they do not even occupy one-quarter of such positions. Although only 17% of women are to be found among the 23 heads of universities, meaning four women, this is actually an improvement over past trends. An earlier survey about female leadership in universities, which was conducted in 2007 and mentioned by HERS-SA (www.hers-sa.org.za/about.htm), found that only 3 of the 23 vice-chancellors and 5 of the 23 university registrars were women. Moreover, in that same year, women comprised 21% of the deputy vice-chancellors and 21% of the executive directors at university.

Table 44: Share (%) of women in selected South African agencies, relating to leadership in science and technology and higher education

	Percentage	Relevant year(s)
Share of women among heads of science councils and national science facilities	19%	2011
Share of women among heads of universities (rectors / vice-chancellors)	17%	2011
Share of women among full professors at university	21%	2009
Share of women among members of the Academy of Science of South Africa (ASSAf)	22%	2011

Sources: Websites of the South African universities, science councils and national science facilities; ASSAf personal communication; HEMIS data on website of Department of Higher Education & Training, Table 3.5.

Note: The National Science Facilities provide “big science” platforms to researchers and research institutions. These platforms are national assets that enable South Africa to be an international role player in strategically important research areas (NRF, 2011b, p. 47).

These figures again show the general under-representation of women in leadership in S&T as they do not even occupy one-quarter of such positions. An earlier survey about female leadership in universities, which was conducted in 2007 and reported by HERS-SA (www.hers-sa.org.za/about.htm), found that only 3 of the 23 vice-chancellors and 5 of the 23 registrars were women. Moreover, in that same year, women comprised 21% of the deputy vice-chancellors and 21% of the executive directors at university.

An initiative that specifically targets female leadership in education is the Forum for African Women Educationalist South Africa (FAWESA). The latter is a South African Chapter of the Forum for African Women Educationalist (FAWE), a partnership of African women cabinet ministers, vice-chancellors of universities, and other senior women policy makers, who assume leadership for education planning and implementation in their countries. FAWESA was formally launched in March 1997 with the primary objective of bringing together female educationalists, policy-makers, researchers, and practitioners to provide gender equity in education and training through addressing policy-making and implementation in education at all levels (http://web.uct.ac.za/org/fawesa/fawesa.htm). FAWESA's specific objectives are:

- To stimulate governments, donors, and NGOs to increase their investment in education, especially in a manner that can accelerate the education of girls & women;
- To promote women's leadership and public policy-making skills within education through targeted capacity-building programmes;
- To gather existing data to design high-impact programmes, taking into account the special needs of female students and teachers;
- To reinvigorate politically the "Education for All" (EFA) goals by emphasizing that fully two-thirds of eligible school children who miss out on education in Africa are females;
- To build public awareness through media of the social and economic advantages of sending girls to school; and
- To help NGOs expand their support for female education.

Lastly, HERS-SA is another initiative that targets women in leadership. HERS-SA is a self-sustaining non-profit organisation, dedicated to the advancement of women in the higher education sector. It is run by part-time management board members and an office administrator, that has advocated for, and contributed to, the career development of women employed in academia via interventions such as hosting the first national conference on Women in Leadership in Higher Education and the annual HERS-SA Academy that attracts women from all over sub-Saharan Africa. The HERS-SA Academy is a seven-day interactive professional development opportunity, aimed at women either in or aspiring to senior leadership positions (www.hers-sa.org.za/about.htm).

Table 45: Share of top and senior managers who are female, 2000-2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Top managers	12.4%	11.9%	13.8%	14.1%	15.1%	16.5%	21.6%	17.8%	17.8%	18.0%
Senior managers	21.0%	17.7%	21.6%	22.3%	23.7%	23.6%	27.4%	24.9%	27.8%	26.7%

Source: Presidency (2010, p. 19)

Table 46: Sex by race distribution (%) of employees in top occupational levels in South Africa, by sector, 2010/11

	Female, South African				Male, South African				Foreign		Total
	Black African	Coloured	Indian	White	Black African	Coloured	Indian	White	Female	Male	
Top management											
Government sector	23.0%	2.6%	0.9%	3.2%	43.6%	7.6%	4.2%	14.2%	0.1%	0.6%	100%
Private sector	2.4%	1.3%	1.4%	12.8%	7.2%	2.9%	5.5%	63.5%	0.4%	2.6%	100%
Total	3.5%	1.4%	1.4%	12.3%	9.2%	3.2%	5.4%	60.8%	0.4%	2.5%	100%
Senior management											
Government sector	20.5%	2.5%	2.3%	8.5%	37.2%	5.5%	4.3%	18.5%	0.2%	0.5%	100%
Private sector	3.8%	2.4%	1.6%	19.4%	8.6%	4.4%	6.7%	49.3%	0.5%	2.0%	100%
Total	5.6%	2.4%	2.6%	18.2%	12.0%	4.5%	6.5%	45.9%	0.5%	1.8%	100%

Source: DoL (2011a, Appendix A, pp. 24-26)

Table 47: Sex by race distribution (%) of promotions and new recruits in top occupational levels in South Africa, 2010/11

	Female, South African				Male, South African				Foreign		Total
	Black African	Coloured	Indian	White	Black African	Coloured	Indian	White	Female	Male	
Top management											
Promotions	4.2%	3.1%	2.1%	19.1%	10.7%	6.3%	6.0%	46.2%	0.6%	1.7%	100%
New recruits	7.1%	2.0%	1.4%	12.5%	14.7%	3.9%	4.9%	47.3%	0.6%	5.6%	100%
Senior management%											
Promotions	8.6%	3.6%	4.5%	20.9%	14.6%	5.5%	6.8%	33.4%	0.6%	1.6%	100%
New recruits	6.8%	2.0%	2.9%	17.8%	12.8%	4.1%	5.4%	44.3%	0.6%	3.2%	100%

Source: DoL (2011a, Appendix A, pp. 28-29)

Dimension 9: Women in Knowledge Economy

The South African Quarterly Labour Force Survey provides evidence with regard to the representation of women in different occupational groups and industry sectors. In Tables 48 and 49 respectively four occupations and three industries have been selected to bring across two points: (1) larger percentages of women occupy administrative and technical support positions in the knowledge economy in relation to managerial and professional positions; and (2) women workers are still predominantly represented in community and social services. No documented evidence could be found of cultural, economic or religious issues affecting these figures.

Table 48: Women as percentage of workers in four occupational groups, 2008-2011

Occupational group	2008	2009	2010	2011
Women as % of managers	31%	32%	28%	31%
Women as % of professionals	45%	45%	44%	46%
Women as % of technicians	55%	53%	56%	56%
Women as % of clerks	68%	71%	68%	69%

Source: Stats SA (2009, Table 3.5, p. 11) & Stats SA (2011c, Table 3.5, p. 23)
Note: Figures from second quarter, i.e. April to June.

Table 49: Women as percentage of workers in three industry sectors, 2008-2011

Industry	2008	2009	2010	2011
Women as % of workers in agriculture	32%	31%	34%	32%
Women as % of workers in manufacturing	33%	33%	33%	34%
Women as % of workers in community and social services	58%	60%	58%	58%

Source: Stats SA (2009, Table 3.1, p. 6) & Stats SA (2011c, Table 3.1, p. 15)
Note: Figures from second quarter, i.e. April to June.

The Millennium Development Goals (MDG) project regards wage employment in the non-agricultural sector as an important indicator of gender parity in employment. According to the MDG progress report, produced by Stats SA (2010a), South Africa is likely to achieve by 2015 the MDG target of 50% of women in wage employment in the non-agricultural sector. However, given that only a 2% increase was registered over the past 14 years (from 43% in 1996 to 45% in 2010) it remains unsure whether a 5% increase could be achieved over the next five years.

Table 50: Share of women (%) in wage employment in the non-agricultural sector, 1996 to 2010

	1996	1999	2005	2010
Women	43%	43%	44%	45%

Stats SA (2010a, Table 3.4, p. 54)

According to a report by the National Advisory Council on Innovation (NACI, 2009a, p. 17), many of the issues and challenges identified by women in the ICT sector, in the study by James et al. (2006), relate to societal issues such as work/life balance and conflict, the under-valuing of women's contributions in the workplace, the negative perception and stereotyping of women in general, and so on. There are, however, specific issues that relate to the ICT sector:

- The lower levels of access to ICTs by women and girls as compared to their male counterparts, particularly in under-served rural areas;
- The absence of female role-models;
- The fast-moving pace of the ICT sector into which re-entry is very difficult; and
- The lack of available guidance on ICT as a career arena.

The ICT labour force appears to be strongly genderised. Core ICT work was still very much a male domain in 2005. More than 81.4% of those doing core ICT work were men and only 18.6% were women. The legacy of women staying away from things technical, both in career choice and in everyday use, thus still prevails in South Africa. The converse, however, applied to the ICT end -user component of the ICT workforce, where women comprised 74.4% of those performing administrative support and secondary ICT work activities, compared to 25.6% of men (James et al., 206, p. 40).

Table 51: Sex breakdown (%) of core ICT workers and ICT end-users, 2005

	Core ICT workers	ICT end-users
Male	81.4%	25.6%
Female	18.6%	74.4%
Total	100%	100%

Source: James et al. (2006, Figure 8.5, p. 40)

Note: Core ICT workers are engaged primarily in the conception, design, development, adaptation, implementation, deployment, training, support, documentation and management of information technology systems, components, or applications. ICT end-users are those individuals who work with computers on a daily basis and in all sectors (not only the ICT sector), but are not involved in ICT core work.

A slight change can be observed in the ratio of men to women in the ICT workforce between 2000 and 2005. In 2000, the total ICT workforce comprised 61.8% women and 38.2% men while women constituted 64.4% and men 35.7% of the total ICT workforce in 2005. However, the core ICT component among men marginally increased while the core ICT component decreased among women over this period. The female end-user component grew by 3.5% while the male end-user component decreased with 2.9% between 2000 and 2005 (James et al., 206, p. 41).

Table 52: Distribution (%) of core ICT workers and ICT end-users, by sex, 2000 and 2005

Occupational group	2000	2005
Men: core ICT workers	14.3%	14.7%
Women: core ICT workers	4.3%	3.4%
Men: ICT end-users	23.9%	21.0%
Women: ICT end-users	57.5%	61.0%
Total	100%	100%

Source: James et al. (2006, Figure 8.6, p. 41)

Between the periods 1996-1999 and 2000-2005, improvements can also be observed in the representation of female workers in ICT manufacturing (up by 8.8%) and in telecommunications (up by 8.3%). Meanwhile the female share of employment in the IT services sub-sector declined (down by 3.4%). Average annual growth rates of 12.8%, 4.5% and -1.8% in ICT manufacturing, telecommunications and IT services were recorded. It is interesting that more females were employed in the telecommunications sector during a phase in which overall employment growth was in decline. Also intriguing is that female's share of the IT services labour market declined in spite of the fact that general employment in this sector was increasing. Further investigation is needed to explore these apparently gendered patterns of employment across the three sectors (Paterson & Roodt, 2008, p. 52).

Table 53: Sex distribution (%) of employment in the ICT sub-sectors in South Africa, 1996-99 and 2000-05

	ICT manufacturing	Telecommunication	ICT services
1996-1999			
Male	69.5%	76.4%	70.7%
Female	30.5%	23.6%	29.3%
Total	100%	100%	100%
2000-2005			
Male	60.7%	67.1%	73.8%
Female	39.3%	32.9%	26.2%
Total	100%	100%	100%

Source: Paterson & Roodt (2008, Table 23, p. 52)

Roodt and Peterson (2008, p. 30) explored the question of equitable access to employment in the occupations of computer professionals and associated professionals by examining race and gender representation. The numbers of black and white male professionals increased over the 1996 to 2005 period, while the numbers of their female counterparts decreased. In terms of annual average growth over the period, black male and white male representation increased by 2.3% and 2.5% respectively. Simultaneously, the average annual employment of black and white females declined by 2.2% and 1.1% respectively, between 1996 and 2005.

Table 54: Sex by race distribution (%) of computer professionals and associated professionals in South Africa, 1996-99 and 2000-05

Occupational group	1996-99	2000-05
Black women	12.4%	9.4%
White women	18.6%	15.0%
Black men	24.2%	26.9%
White men	44.8%	48.8%
Total	100%	100%

Source: Roodt & Paterson (2008, Table 11, p. 30)

Note: “Black” is used here in the political sense, to include Africans, coloureds and Indians.

Dimension 10: Women in S&T and Innovation Systems

The White Paper on S&T (DACST, 1996) only makes brief reference to the under-representation and low participation of women in the South African science system. The country’s National Research and Development Strategy, published in 2002, provides a clearer diagnosis of the state of affairs, by stating that South Africa has an aging, predominantly white male, scientific and engineering workforce. The so-called “frozen demographics” referred to, meant that the country is lacking sufficient new entrants, including women, to undergraduate and postgraduate SET ranks. A special programme for the promotion of women in science were therefore proposed by the Department of Science and Technology, namely a reference group consisting of stakeholders and representatives of organisations with interest in the progress of women in science, to monitor and advise the department on relevant issues (DST, 2002, pp. 31 & 36).

This reference group eventually became the Science, Engineering and Technology for Women (SET4W), which is an advisory committee of the National Advisory Council on Innovation (NACI), established in 2003 (www.nacinnovation.biz/about-naci/naci-sub-committees/set4women). The committee comprises of a team of experts who investigate policy issues in the areas of science, technology, innovation and gender. The committee works through the NACI Council to advise the Minister of Science and Technology on gender mainstreaming in the science, technology and innovation environment (STI). The functions of the committee include:

- Providing advice to the Minister of Science and Technology on gender mainstreaming and on strategies to increase women's participation in the STI environment;
- Informing the research agenda of STI from a gender mainstreaming perspective;
- Monitoring and facilitating effective participation of women in STI;
- Facilitate networking by women and women's association in STI; and
- Promoting traditional and indigenous science knowledge for purposes of mainstreaming gender in the science, technology and innovation environment.

The aim of establishing SET4W was therefore to strengthen women-led initiatives in all phases of participation within the SET sector, from school to career achievement (NACI, 2009b, p. 4). In this regard SET4W has commissioned a number of studies into the state of women in SET, and some of these facts and figures are incorporated in the discussions below.

Women studying SET at tertiary level

Women constituted 57% of all university enrolments in 2009, based on an own calculation of data from the Higher Education Management and Information System (HEMIS) at the Department of Higher Education and Training, which is available on the internet. Table 55 presents broad field comparisons (SET versus other) for men and women at different qualification levels. As can be seen, SET graduates are under-represented at all qualification levels and this observation is true for both women and men. However larger proportions of male graduates are enrolled for SET programmes than is the case for female graduates. For example, 45% of all male graduates in the upper postgraduate qualification category graduated in SET programmes, compared to 39% of female graduates in the same category.

Table 55: Sex distribution (%) of SET graduates versus other graduates, by qualification grouping, 2009

	Undergraduate qualification		Lower postgraduate qualification		Upper postgraduate qualification		All qualifications	
	Women	Men	Women	Men	Women	Men	Women	Men
SET	22%	37%	23%	28%	39%	45%	23%	36%
Other	78%	63%	77%	72%	61%	55%	77%	64%
Total	100% (66 741)	100% (42 028)	100% (16 824)	100% (9 766)	100% (4 508)	100% (4 984)	100% (88 074)	100% (56 779)

Source: Calculated from HEMIS data on website of Department of Higher Education & Training, Table 2.13.

Note: SET = Science, engineering and technology
Other = Business and commerce, and education and other humanities
Undergraduate = Undergraduate diplomas, certificates and bachelors degrees
Lower postgraduate = Postgraduate diplomas, national higher diplomas, postgraduate bachelor degrees, honours degrees
Upper postgraduate = Masters and doctoral degrees

Focusing the attention on SET qualifications only, one can see that, in 2009, women comprised 50% of all SET graduates, meaning that the other 50% were men (Table 56). However, SET graduates in the upper postgraduate category are skewed towards men (only 44% female graduates). The only qualification category where women are in the majority

pertains to lower postgraduate qualifications. This is because women are significantly more likely than men to do postgraduate certificates and postgraduate diplomas. In the case of student enrolments (as opposed to student graduates) the overall representation of women in the pool of SET students is even lower (45% of all SET enrolments in 2009).

Table 56: Women's share of SET enrolments and graduates at tertiary level, by qualification grouping, 2009

Indicator	Undergraduate qualification	Lower postgraduate qualification	Upper postgraduate qualification	All qualifications
Women as % of all SET enrolments	44%	57%	45%	45%
Women as % of all SET graduates	48%	58%	44%	50%

Source: Calculated from HEMIS data on website of Department of Higher Education & Training, Table 2.13.

The overall picture for doctoral degrees, as the highest postgraduate qualification, is that the shares of women have been decreasing during the early 2000s (from about 41% in 2001 to less than 40% during 2002 to 2004). Currently the share of women seems to be stabilizing around 43% (Table 57). However, the statistics include both SET and other doctoral degrees and for that reason need to be disaggregated in terms of field. The comparison is between the years 2000 and 2007, and for women only.

Table 57: Sex distribution (%) of doctoral graduates, 2000-2007

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Male	59%	63%	61%	61%	62%	56%	57%	58%	57%	57%
Female	41%	37%	39%	39%	38%	44%	43%	42%	43%	43%

Source: ASSAf (2010, Table 3, p. 47)

Women are particularly well-represented among doctoral graduates in both health and social sciences, according to Table 58 below. However, only about a third of graduates in natural and agricultural sciences and in humanities are female. The trend over time is reversed for these two fields – in humanities the share of women increased from 2000 to 2007, and in natural and agricultural sciences it deceased over the same period. In engineering sciences, materials and technologies the share of female graduate remains critically low (only 15% in 2007) (ASSAf, 2010, p. 47). No reasons exist for the decline of women among doctoral graduates in natural, agricultural and engineering sciences, and theories in this regard need to be developed and investigated, e.g. more women in the natural, agricultural and engineering sciences are completing their doctoral studies abroad and for that that reason are not included in the South African statistics.

Table 58: Women's share of doctoral graduates, by broad field of study, 2000 and 2007

Broad field	2000	2007
Health sciences	59%	62%
Social sciences	48%	51%
Natural & agricultural sciences	41%	36%
Humanities	27%	32%
Engineering science, materials & technologies	17%	15%

Source: ASSAf (2010, Table 4, p. 48)

An inspection in terms of race, for the year 2007, shows that female representation is significantly better among white doctoral graduates in all fields with the exception of two (Table 59). In engineering sciences, materials and technologies only about 11% of female graduates are white compared to 22% of black graduates, and in health sciences the representation of women among black and white graduates can be regarded as almost equally good (65% and 60%) (ASSAf, 2010. p. 48).

Table 59: Women's share of doctoral graduates in each race group, by broad field of study, 2007

Broad field	"Black" (i.e. African, coloured & Indian)	White
Health sciences	65%	60%
Social sciences	41%	63%
Natural & agricultural sciences	21%	47%
Humanities	24%	38%
Engineering, materials & technologies	22%	11%
All fields	33%	48%

Source: ASSAf (2010, Table 5, p. 48)

Women in SET occupations

Women's share of academic staff (instruction and research) at South African universities is consistently growing, from 42% in 2005 to 44% in 2009. However, women in academia are over-represented in administrative positions (about 63% in 2009) and this figure also seems to be growing (from 60% in 2005). A closer look at the ranks occupied by female academics (Table 61) shows that they are particularly well-represented in ranks that lie below senior levels: lecturer (52% representation), junior lecturer (54%) and below junior lecturer (66%). Although these figures point to women's under-representation in the higher ranks (senior lecturer and above) they could also indicate that more women than men are currently entering the higher education system from below. That being said, if one compares the rank distribution of women and men then 48% of all female academics are lecturers compared to 35% of men. Moreover, about 21% of male academics are appointed as either full or associate professor compared to 14% of women. In order to move into higher ranks one could argue that, apart from a doctoral qualification, a portfolio of article publications is also required. We will turn to publication activity later in this section.

Table 60: Women's share of permanent academic and administrative staff at universities, 2005 to 2009

	2005	2006	2007	2008	2009
Women as percentage of permanent academic staff	42%	42%	43%	43%	44%
Women as percentage of permanent administrative staff	60%	59%	61%	62%	63%

Source: DBE (2010, Table 23, p. 39); DoE (2006a, Table 21, p. 40); DoE (2008, Table 24, p. 41); DoE (2009, Table 24, p. 41); DoE (2010b, Table 23, p. 41)

Note: Academic staff members are those who spend more than 50% of their official time on instruction and research activities. Administrative staff members include all executive and professional staff who spend less than 50% of their official time in instructing and research activities, as well as technical and office staff.

Table 61: Rank distributions of female academics, 2009

Rank	% of women within each rank	Rank distribution of women	Rank distribution of men
Professor	21%	6%	18%
Associate professor	33%	8%	13%
Director	9%	0%	1%
Associate director	22%	0%	1%
Senior lecturer	43%	25%	26%
Lecturer	52%	48%	35%
Junior lecturer	54%	7%	5%
Below junior lecturer	66%	1%	0%
Undesignated/other	58%	4%	2%
Total	44%	100% (N= 7127)	100% (N=9193)

Source: Calculated from HEMIS data on website of Department of Higher Education & Training, Table 3.5.

Moreover, women are critically under-represented in engineering professions in the country, e.g. only 16% in 2004, although it is an improvement over the 10% registered for 2000 (Table 62). Also, the South African Council for Natural Scientific Professions (SACNASP) that registers natural scientists, recorded that, in 2006, 16% of their registered professionals were female (Lorentzen & Petersen, 2008, Table 1.9, p. 24). The situation is better in biotechnology, where women comprise 52% of biotechnology related employees in biotechnology active companies in South Africa (DST, 2007, Figure 5, p.11).

Table 62: Sex distribution (%) of available engineers in South Africa, 1994, 1999 & 2004

	1994	1999	2004
Male	90%	87%	84%
Female	10%	13%	16%
Total	100%	100%	100%

Source: NACI (2010, pp. 49 & 51)
Note: Availability refers to the number of individuals with qualifications in a particular field (in this case in engineering) as recorded in the National Learners' Records Database (NLRD) managed by the South African Qualifications Authority (SAQA).

An analysis of the shares of women researchers in the country (Table 63) shows that the not-for-profit sector employs the highest percentage of women researchers (46.6% in 2008/09). However, the number of researchers employed in this sector is less than 1% of the total (DST, 2010, p.˚19). Female representation has increased in the business sector (from 26% in 2001/02 to about 30% in 2008/09) and in the government sector which, in this table, includes the science councils (from 37% in 2001/02 to 41% in 2008/09).

Table 63: Women researchers as percentage of total researchers in South Africa, by sector and year of R&D survey

Sector	2001/02	2003/04	2004/05	2006/07	2007/08	2008/09
Business	--	25.7%	26.8%	28.8%	28.9%	29.5%
Government & science councils	--	37.0%	38.9%	39.6%	40.6%	41.4%
Higher education	--	40.7%	40.8%	42.9%	43.6%	42.5%
Not-for-profit	--	51.0%	49.5%	49.6%	49.2%	46.6%
All sectors	**35.3%**	**38.0%**	**38.3%**	**39.7%**	**40.3%**	**39.7%**

Source: DST 2004 (Figure 5, p. 17); DST 2005 (Figure 5, p. 17 & Figure 6, p. 19); DST 2006 (Figure 5, p. 17 & Figure 6, p. 19); DST 2008 (Figure 5, p. 17 & Figure 6, p. 19); DST 2009b (Figure 5, p. 17 & Figure 6, p. 19); DST 2010 (Figure 5, p. 17 & Figure 6, p. 19)

In all sectors, in Table 64, if the percentage of female researchers is disaggregated in terms of race, we observe the under-representation of female researchers of colour, although less so in the government (20% each of African and white female researchers) and science council sectors (15%.of African female versus 18% of white female researchers). The difference between the proportions for African and white female researchers is largest in the higher education sector, where the two groups respectively account for 8% and 28% of all researchers. The most equitable research profile appears for the government sector, where the proportions of white female and white male researchers (24% each) are closest to those of African female and African male researchers (20% each). However, in terms of research support staff the government sector has the lowest share of women, as 66% of all R&D support staff in government are either African or coloured men.

The business sector not only recorded the lowest share of female researchers (30%) but also the lowest share of female technicians (31%). In both categories in the business sector white males are most prominent, representing 52% of researchers and 42% of technicians.

The Gender and Development Unit at the Human Sciences Research Council undertook a quantitative and qualitative assessment of the participation of women in the industrial science, engineering and technology sector. The study was conducted on behalf of the (then) South African Reference Group on Women in Science and Technology (SARG) of the National Advisory Council on Innovation. In the quantitative study a questionnaire was administered to a sample of 90 women in SET companies across South Africa, of which 46% were from state-owned enterprises. The respondents identified the work environment as a key factor in facilitating or inhibiting women's participation in the SET sector. For example, feedback on work performance, remuneration and promotion opportunities, gender relations in the workplace, race relations, mentorship and career development opportunities, and implications of a career on in SET for family life, were factors identified as playing a role in determining women's participation in the SET industry (NACI, 2008, p. viii & pp. 41-48).

Moreover, based on the in-depth interviewing of 38 senior women and CEOs from the same study, several factors were identified as facilitating or inhibiting women's recruitment, retention and advancement in industrial SET. These include the masculine image of science; gender-blind workplace policies with no emphasis on female participation; the casting of women into supportive roles; the challenge of balancing work and family responsibility; women's status as "previously disadvantaged individuals" (PDIs) which could result in them becoming complacent and regularly changing positions as they are popular to appoint due to their PDI status; gender discrimination and masculine organisational culture; sexual harassment; and the "'glass ceiling" (NACI, 2008, pp. viii-ix & pp. 48-60).

Table 64: Distribution (%) of R&D headcount personnel in South Africa, by sex, race and sector, 2008/09

	Female				Male				Total	Overall without race breakdown	
	African	Coloured	Indian	White	African	Coloured	Indian	White		Female	Male
Business sector											
Researchers	7%	2%	4%	17%	10%	3%	6%	52%	100%	30%	70%
Technicians	11%	2%	4%	14%	20%	4%	6%	40%	100%	31%	69%
Other support	13%	7%	3%	22%	26%	4%	5%	19%	100%	45%	55%
Total R&D personnel	10%	3%	4%	17%	17%	4%	6%	40%	100%	34%	66%
Government sector											
Researchers	20%	4%	3%	20%	24%	3%	3%	24%	100%	47%	53%
Technicians	23%	2%	3%	18%	34%	4%	2%	16%	100%	46%	54%
Other support	12%	6%	2%	9%	42%	24%	0%	5%	100%	28%	72%
Total R&D personnel	18%	4%	3%	16%	33%	10%	2%	15%	100%	40%	60%
Higher education sector											
Researchers	8%	3%	4%	28%	14%	3%	5%	35%	100%	43%	57%
Technicians	11%	5%	3%	22%	17%	10%	6%	27%	100%	41%	59%
Other support	14%	7%	3%	38%	13%	4%	3%	17%	100%	63%	37%
Total R&D personnel	9%	3%	4%	29%	14%	4%	5%	33%	100%	45%	55%
Not-for-profit sector											
Researchers	12%	2%	6%	27%	22%	4%	2%	26%	100%	47%	53%
Technicians	22%	6%	6%	8%	31%	4%	5%	17%	100%	43%	57%
Other support	37%	15%	4%	19%	10%	2%	2%	10%	100%	75%	25%
Total R&D personnel	22%	7%	5%	22%	20%	3%	3%	19%	100%	55%	45%
Science council sector											
Researchers	15%	2%	4%	18%	21%	3%	4%	33%	100%	39%	61%
Technicians	27%	3%	3%	15%	26%	5%	1%	20%	100%	48%	52%
Other support	26%	6%	2%	16%	32%	4%	2%	11%	100%	50%	50%
Total R&D personnel	21%	3%	3%	17%	26%	4%	3%	23%	100%	44%	56%
All sectors											
Researchers	9%	2%	4%	24%	14%	3%	5%	39%	100%	39%	61%
Technicians	14%	3%	4%	16%	21%	5%	5%	32%	100%	37%	63%
Other support	16%	7%	3%	23%	26%	6%	4%	15%	100%	48%	52%
Total R&D personnel	11%	3%	4%	22%	18%	4%	5%	33%	100%	40%	60%

Source: DST (2011b, Table 1.14, p. 20; Table 2.12.1, p. 30; Table 3.10.1, p. 32; Table 4.12.1, p. 54; Table 5.10.1, p. 63; & Table 6.11.1, p. 73)

A report by the National Advisory Council on Innovation (NACI, 2009a, pp. 13-15) also highlights a number of critical challenges that South African women in the current SET workforce are confronted with throughout their lifecycle. The challenges are derived from commissioned research and consultative conferences on women in science that took place during 2005. The identified challenges must be addressed at policy level in order for women to participate in and benefit equitably from the SET sector. These challenges include: (1) historical factors, (2) gender stereotyping within the family and society, (3) barriers experienced at primary, secondary and tertiary education levels, (4) barriers, obstacles and constraints at SET workplaces, and (5) public funding of SET/R&D activities. Brief descriptions of these challenges, taken from the 2009 NACI report, are presented in bulleted form below:

History

- The education policies of the apartheid system (i.e. before 1994) denied black women the opportunity to gain SET qualifications. White, Indian/Asian and coloured women were also not encouraged to obtain SET qualifications. As a result there are currently very few women in the SET sector to serve as role models for young girls and women wishing to pursue careers in SET.

Gender stereotyping within the family and society

- Many South African parents tend to encourage gender-consistent study preferences and career choices. As a result young girls often doubt their ability in science and mathematics (science anxiety) either before or soon after they enter the formal education system. Social institutions such as playgrounds and religious organisations also contribute towards stereotypes of male superiority in scientific and mathematical aptitude.

Barriers experienced at primary, secondary and tertiary education levels

- Many educators in South Africa believe that science, mathematics, engineering and technology are fields of study that women cannot excel in, and that girls' achievements in these areas are due to disproportionate levels of effort rather than capability. Educators' negative attitudes towards girls' ability to excel in mathematics and science can contribute significantly to the phenomenon of 'science anxiety' among girls. Examples of negative attitudes exhibited by educators include instances where educators ask girls and women fewer difficult questions, direct comments less often to girls and women, and avoid using girls and women in scientific classroom demonstrations.
- It was noted that the illustrations, examples and demonstrations used in textbooks by science educators (who are mostly men) contain a strong gender bias that portrays boys and men as active participants in scientific activities, while girls and women are portrayed as passive observers or 'amazed onlookers'.
- During childhood, girls and young women are expected to take up numerous domestic chores, which are time-consuming and exhausting. For many young women, these chores remain a burden throughout higher education. SET disciplines are time-intensive. Gender imbalances in time allocation disproportionately disadvantage girls and young women and tend to limit their successful pursuit of SET studies.
- Financial constraints may result in (1) girls' access to primary and secondary education being sacrificed altogether, (2) girls being forced to take less expensive high school subject combinations outside the science stream, and, ultimately (3) girls pursuing studies in arts and humanities and thus not ending up in SET careers.
- Access to information about SET careers is essential. Women scientists' decision to study SET disciplines appears to be greatly influenced by science expos and visits to SET workplaces organised by their schools.

Barriers, obstacles and constraints at SET workplaces

- Doubts about the competence of women in the SET field place women with SET potential far below their male counterparts on the recruitment preference lists. Such negative recruitment practices tend to discourage women graduates with SET qualifications from seeking a career in SET workplaces. Women are also disadvantaged at the recruitment

stage because their grades are generally not perceived as 'impressive' in comparison with those of men.

- Discriminatory practices and gender-insensitive behaviours are prevalent in the male-dominated SET workplace, including patronising behaviour that impacts negatively on women's self-esteem and sense of achievement; dissociating successful women from their high quality outputs; failure to acknowledge women's contributions; low input/reward ratio in that opportunities and remuneration offer poor incentives for professional advancement; and the older generation restraining young women scientists' rapid progress.
- Women's professional development in SET is also inhibited by a lack of appropriate facilities and equipment necessary to operate productively. Furthermore, women tend to be excluded from large-scale, high-impact projects. With few women represented in senior decision-making decision-levels, women's concerns are often not addressed, resulting in a system that is unable to attract and retain women in sufficient numbers or of suitable calibre.
- The rate of change in SET knowledge is high, requiring SET workers to constantly update their knowledge through reading and attending conferences, seminars and training/renewal courses, in addition to the usual requirements of the job. Gender imbalances in relation to family responsibilities mean that most women experience time and social constraints, limiting their ability to further themselves within a demanding SET work environment.
- Many women's careers in SET are interrupted due to child-bearing and child-rearing. The presents the career-orientated woman with a dilemma. On the one hand, employers tend not to be sympathetic to women's needs at this time, perceiving them to be unproductive or under-productive. On the other hand, the woman's career is at a standstill, while technological advances in her field and the professional growth of her colleagues (who are mostly male) continue unabated. Re-entry presents its own challenges, often requiring "re-orientation" and/or re-training following extended absence.
- Given the limited number of senior women in the sector, many young graduates work with male mentors, some of whom are insensitive to gender issues. While some women report positive experiences with their male mentors, many more have negative experiences, including sexism, victimisation and sexual harassment.
- Existing gender imbalances in decision-making processes within the SET sector are of particular concern insofar as they affect how science budgets are spent, who is involved in recruitment processes, who presides over promotion decisions, who sits on prize-giving and peer-review committees, who should be admitted into elite scientific societies, who speaks on behalf of science in the media, etc.

Public funding of SET/R&D activities

- Of particular concern is the fact that instances abound where conditions for PhD and research grant funding have age restrictions. Such age restrictions discriminate against women because of their life cycle which is different than that of men given their child rearing responsibilities.

A summary of the challenges faced by women in different life cycles, as presented in the 2009 NACI report, appears in Table 65 on the next page.

Table 65: Challenges women face in SET during life-cycle

Life-cycle	Challenge
0-6 years	Boys and girls given differing perspectives on their SET capacity
7-18 years	Parents and school influence/impose gendered subject choices e.g. girls = arts; boys = maths & science
19-24 years	Both males & females enter science stream. But many girls experience obstacles, including science anxiety and leaky pipeline, so do not pursue SET studies through postgraduate levels and do not choose SET careers
21-25 years	More women opt out of SET system Difficulty securing economically viable positions
25-35 years	Career versus family Lack of gender sensitive mentoring programmes & role models
35-60 years	Glass ceiling effect: failure to acknowledge women's contributions & previous experience
60+ years	No structure for mentoring role related to opportunities for younger SET workforce Retirement and exclusion from decision-making Funding constraints for PhD studies and limited support for researcher development and publication

Source: NACI (2009a, p. 12, Figure 2)

Publication output of women scientists

Lower scholarly productivity could also work against women's progress into higher ranks at university, particularly promotions into professorships, and for that reason is also of relevance here. Table 66 shows a comparison of the sex distribution of South African article authors over two 5-year periods. The female share of publishing authors increased from 30% to 33% between these periods but the latest figure of 33.1% is still significantly less than the corresponding figure for men.

Table 66: Sex distribution (%) of publishing scientists in South Africa, 1995-2000 and 2001-2005

	1995-2000	2001-2005
Male	69.4%	66.9%
Female	30.6%	33.1%
Total	100%	100%

Source: NACI (2009b, p. 29)

Moreover, between 1995 and 2000, the share of article equivalents produced by women averaged about 21-22%. This increased to 25% in 2001, where after this percentage was maintained up to 2005. Female publishing scientists contributed a quarter of all article outputs produced by South African scientists during this period (NACI, 2010, p. 31).

Table 67: Distribution of article equivalents among South African female and male scientists, 1995-2005

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Female	21%	22%	21%	22%	22%	22%	25%	25%	25%	25%	25%
Male	79%	78%	79%	78%	78%	78%	75%	75%	75%	75%	75%

Source: NACI (2010, Table 13, p.20)

Note: An article equivalent is a fractional count that expresses an author's relative contribution to an article. For instance, if three researchers co-authored an article and only one author is female, the woman will receive an article equivalent of 0.33. Since the remaining two authors are male, men will receive a total article equivalent of 0.66.

According to ASSAf (2011, p. 129) attempts have been made to correct the inherited pattern of white, male dominance in published research and scholarship. Although the proportion of published output by women scholars has improved, their contribution remains low – never more than 40% except for Public/Community Health and Education where the respective percentages equal 50%. There are distinct disciplinary or field differences with respect to these inequalities. In Religious Studies, for instance, women scholars account for only 9% of total outputs of article equivalents in published research, and in Psychology women produced less of the total corpus of published articles (26%) than a decade earlier (29%). Also in Physical Sciences and in Engineering article units by female authors are critically law. The general point is that whatever the strategies applied over the past decade and more, it has not made a significant difference in reducing inequalities in knowledge production in the national system. In Engineering, for instance, the low article output by female authors can be a direct consequence of their under-representation in terms of headcount enrolments.

Table 68: Women's share of article output, by scientific field, 1990-1992 and 2002-2004

	1990-1992	2002-2004
Agricultural sciences	14%	24%
Biological sciences	15%	25%
Chemical sciences	10%	19%
Earth sciences	15%	25%
Mathematical sciences & ICT	9%	13%
Physical sciences	5%	7%
Multidisciplinary sciences	13%	22%
Engineering & applied technologies	6%	11%
Basic health	20%	30%
Clinical health	14%	27%
Public/community health	26%	50%
Economic & management sciences	11%	21%
Education	27%	50%
Psychology	29%	26%
Sociology & related studies	27%	34%
Other social sciences	32%	33%
Language & linguistics	29%	38%
Law	24%	29%
Religion	4%	9%
Other humanities & arts	21%	26%

Source: Mouton & Gevers (2010, Table 1.7, p. 64)

Prozesky (2006, pp. 351-359) interviewed 16 highly productive South African academics in an attempt to understand the factors that relate to the gendered nature of article production. The results show that women, at the entry stage of their careers, tend to delay the attainment of a PhD (which is closely related to publication productivity) in order to accommodate the needs of their young children as well as their husband's career. However, although the female academics did not interrupt their academic careers for more than a few months at a time, their professional mobility was nevertheless limited. Professional mobility is important for building a research career and research networking. For that reason teaching was often seen as more compatible than research is with regard to the raising of young children.

The women in Prozesky's study, of whom all but one have children, also displayed high levels of personal discipline and sacrifice in order to sustain their output productivity, and constantly implemented practical adaptations (e.g. narrowing the distance between the workplace, childcare facilities and schools; relying on paid help and friends and families, etc.). On the other hand, most of the productive men in the study were married to wives who were not economically active whereas all the females' husbands worked full-time. Moreover, almost all the men perceived their role as a parent as irrelevant to their career experiences, thus often prioritizing their work over their family. Whereas women mentioned administrative duties associated with senior management positions as time consuming and hindering their productivity, men were more likely to mention gate-keeping responsibilities, e.g. editorships, as constraints.

Moreover, an analysis of the CVs of the productive academics shows that the women, on average, are more likely than the men to collaborate with others. The perspective of article collaboration is however a gendered perspective, according to the interviews. Men view collaboration and co-authorship as a source of new ideas and as a way to maximise their output under time constraints whereas women, on the other hand, tend to value the collegial interaction provided by collaboration, particularly solutions for problems experienced.

Lastly, in Prozesky's study, the teaching of large undergraduate classes characterised mostly female academics whereas the senior men saw such teaching as something of the past and underscored a postgraduate focus. Moreover, the men often found enjoyment solely from their research work whereas the women, although also passionate about research, declare it as not necessarily their "first and only" love. The women also revealed a stronger commitment to teaching and family-related commitments outside the workplace.

Brain drain and female scientists

No recent data could be found with regard to gender trends in brain drain in highly skilled fields. However, since scientists are most likely classified as occupying professional occupations, we will compare the shares of women emigrants in professional occupations against the shares of women among emigrants in other occupation groups. As can be seen below, women are well-represented among professional emigrants (between 44-48%). Moreover, based on additional statistics we know that women comprise about 45% of professionals (Stats SA, 2011c, p. 23). This means that the proportion of female professionals who emigrate is more or less similar to the proportion of female professionals in the population. Thus, female and male professionals do not disproportionately emigrate relative to their sizes in the population. However, the extent to which this argument can also be applied to scientists as a special category of professionals is unclear.

Table 69: Women's share of self-declared emigrants by occupation group, 2000-2003

Occupation group	2000	2001	2002	2003
Professional occupations	44%	47%	48%	47%
Managerial & administrative occupations	27%	33%	33%	29%
Clerical & sales occupations	58%	65%	66%	57%
Transport & communications occupations	30%	23%	24%	30%
Service occupations	51%	49%	43%	47%
Earning & related occupations	9%	3%	8%	21%
Artisan & related occupations	6%	5%	5%	7%
Production & related workers	20%	35%	28%	37%
Occupation unspecified	56%	54%	52%	52%
Not economically active	59%	60%	62%	60%
Total	50%	53%	52%	50%

Source: Stats SA (2010c, Table 5.5, p. 5.6)

Initiatives to support and strengthen the participation and contribution of women scientists

The National Research Foundation (NRF) is the official research funding agency in South Africa. The Research and Innovation Support and Advancement (RISA) division of the NRF is the agency that translates the S&T strategies and policies of government into programmes and initiatives that support research institutions and researchers. The key function of RISA is to ensure that the country has appropriately qualified people and the necessary high-level infrastructure to produce knowledge that can transform the economy of South Africa into one that can compete globally. RISA, among other functions, provides expertise in research management through models such as the Centres of Excellence (CoEs) and the South African Research Chairs Initiative (SARChI), and manages a grant-making and administration service (NRF 2011b, p. 33). Funding support is provided to postgraduate studies at the honours, masters and doctoral levels, as well as to postdoctoral fellows (NRF, 2011a, p.63).

The NRF also manages a rating system that identifies researchers who count among the leaders in their fields of expertise and gives recognition to those who constantly produce high quality research outputs. Several South African universities use the outcomes of the NRF evaluation and rating process to position themselves as research-intensive institutions, while others provide incentives for their staff members to acquire and maintain a rating and give special recognition to top-rated researchers. Of the nearly 16 000 staff members in academic and related positions at South African higher education institutions, 10% have a valid rating from the NRF. Moreover, rated researchers produce some 70% of the research students funded by the NRF, as well as 70% of the research outputs in the Web of Science generated via NRF funding. In the evaluation and rating of individual researchers, the NRF approaches external experts to review researchers in South Africa who have reached the highest standards of research, as well as those who have the potential to become future research leaders. These expert reviewers base their opinions on the quality and impact of each applicant's research outputs and achievements. They assess each applicant's standing as a researcher based on his/her work over the past eight years (NRF, 2011c, pp. 2, 6 & 16).

The South African Research Chairs Initiative (SARChI) is a knowledge and human capacity-building intervention that is managed by the NRF on behalf of the Department of Science and Technology. The programme funds research chairs with excellent research track records in any discipline. SARChI has five main objectives (NRF 2011b, pp. 34-36):

- Expand the scientific research and innovation capacity of South Africa;

- Improve South Africa's international research and innovation competitiveness while responding to social and economic challenges of the country;
- Attract and retain excellent researchers and scientists;
- Increase the production of Master's and doctoral graduates; and
- Create research career pathways for young and mid-career researchers with a strong research, innovation and human capital development output trajectory.

The SARChI initiative is proving to be an effective instrument for developing human capital. The initiative is successfully contributing to the transformation of South Africa's cohort of scientists. The number of postgraduate students supported by research chair grants has grown, e.g. from 115 in 2007 (when there were only 21 research chairs) to 423 in 2009 (under 72 research chairs). Of the students supported in 2009, 47% were female. In addition to students supported by and from the SARChI grants, research chair holders also mentor students supported from other sources of funding. The number of these students increased from 252 in 2008 to 367 in 2009 (DST, 2009a, p. 24). At the end of 2010, 20% of the research chairs were female (Mtwisha, 2010).

Moreover, the Thuthuka Programme of the NRF, initiated in 2001, is central to the organisations human capital development strategy. The programme aims to develop human capital and to improve the research capacities of designated (i.e., black, female and disabled) researchers, ultimately redressing historical imbalances. This is done in partnership with South African universities and research institutions. The programme seeks to achieve this through its specific research grant which funds grant holders participating in research from a wide range of scientific disciplines. While the primary aim of the Thuthuka programme remains to promote professional development of researchers from designated groups, participation of non-designated individuals are not excluded (NRF, 2010).

Table 70 shows the proportions of female students and grantholders (academics and researchers) supported by the NRF as well as the percentage of female rated scientists. Medium-term targets for the different categories are also provided. However, as can be seen, only the percentage of female NRF-rated researchers has been consistently growing and is therefore on target. The percentage of female grantholders supported by the NRF is consistently decreasing and significantly below the medium-term target. The reason for this is not clear.

Table 70: NRF performance in terms of selected targets for women supported, 2007/08 to 2010/11, compared with medium-term targets

	Actual				Medium-term target		
	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Percentage of female 3rd year / 4th year students supported	56%	49%	56%	45%	56%	56%	56%
Percentage of female BTech / honours students supported	59%	55%	59%	54%	59%	59%	59%
Percentage of female masters students supported	53%	51%	52%	50%	53%	53%	53%
Percentage of female doctoral students supported	49%	50%	51%	48%	52%	53%	53%
Percentage of female postdoctoral students supported	33%	41%	48%	42%	48%	49%	49%
Percentage of female NRF-grantholders	37%	37%	35%	34%	40%	40%	40%
Percentage of female NRF-rated researchers	25%	26%	27%	28%	27%	28%	28%

Source: NRF (2011a, Table 16, p. 116); NRF (2011b, Table 13, p. 119)

The South African Women in Science Awards is an attempt by the Department of Science and Technology to recognise women with distinguished achievements in science, technology, innovation and research. The award, initiated in 2003, pays tribute to women scientists as role models and thereby hopes to encourage more women to consider research professions as rewarding careers. Although the quality of applications is exceptional the racial profile of the winners remains a challenge (DST, 2009a, p. 24).

The Association of South African Women in Science and Engineering (SA WISE) also deserves to be mentioned. It is a dynamic association for all those who support the idea of strengthening the role of women in science and engineering in South Africa (http://web.uct.ac.za/org/sawise). SA WISE aims to strengthen this role by *inter alia*:

- raising the profile of women scientists and engineers;
- highlighting and addressing problems faced specifically by women in these fields;
- lobbying for the advancement of women in science and engineering; and
- providing leadership and role models for young people wishing to enter the fields of science and engineering.

Lastly, there is also the South African Association of Women Graduates (SAAWG), which offers graduate women a unique opportunity for scientific networking is the. The latter is a non-profit organisation of graduate women founded in 1923, and which is affiliated to the International Federation of University Women (IFUW) and the Federation of University Women of Africa (FUWA). The focus of SAAWG is to establish networks among graduate women, and the use of knowledge and skills gained from tertiary education for the betterment of other women. Women who have studied at a university or institution of comparable academic standing and who have been awarded a degree or equivalent diploma licence or certificate recognised by IFUW are legible for membership of SAAWG. Women engaged in research work of postgraduate standard can also become members. The aims of SAAWG are five-fold (www.ifuw.org/southafrica/index.shtml):

- To promote understanding and friendship among all women graduates in South Africa, and through membership of IFUW among women graduates throughout the world, irrespective of race, nationality, religion or political opinions;
- To represent women graduates in South Africa and to act on their behalf;
- To encourage the application of their knowledge and skills in the solving of problems that arise at all levels of public life whether local, national, regional or worldwide, and where appropriate through the International Federation of University Women;
- To further the development of education and its dissemination among all people in South Africa; and
- To promote co-operation between SAAWG and other national, provincial or local organisations.

Women's early stage entrepreneurial activity

Table 71 below summarises data from the Global Entrepreneurship Monitor (GEM) for 2009 regarding male and female involvement in entrepreneurial activity in South Africa. Men are substantially more likely than are women to be involved in both early stage entrepreneurship and established businesses (Herringten, Kew & Kew, 2009, p. 68).

Table 71: Involvement in entrepreneurial activity, by sex, GEM 2009

Type of entrepreneurial activity	Women	Men
Total early-stage entrepreneurial activity (TEA)	40%	60%
Nascent entrepreneur	39%	61%
New firm owner/manager	42%	58%
Established firm owner/manager	38%	62%

Source: Herringten, Kew & Kew (2009, Table 4.6, p. 69)

Note: TEA indicates the prevalence of business startups (or nascent entrepreneurs) and new firms in the adult (18 to 64 years of age) population – in other words, it captures the level of dynamic entrepreneurial activity in a country.

Moreover, relating entrepreneurial activity to the population, there seems to be a low level of female entrepreneurial activity in South Africa, with 4.7% of the adult female population participating in such activity, compared to 7.1% of the adult male population (Table 72).

Table 72: Early-stage entrepreneurial rate (i.e. percentage of the adult population who have started or are in the process of starting a business), by sex, GEM 2001-2009

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Men	5.9%	7.1%	4.5%	5.5%	5.7%	5.5%	nd	9.6%	7.1%
Women	2.7%	5.4%	3.7%	4.7%	4.4%	4.5%	nd	5.9%	4.7%

Source: Herringten, Kew & Kew (2009, Table 3.9, p. 40)

GEM research has also highlighted the importance of individuals' perceptions of their entrepreneurial ability, their recognition of start-up opportunities and the extent to which their social networks include entrepreneurs in determining whether these individuals become involved in early-stage entrepreneurial activity. Moreover, for all three factors, South African women in 2009 scored significantly lower than men did (Herringten, Kew & Kew, 2009, p. 68).

Table 73: Entrepreneurial attitude and perceptions, by sex, GEM 2009

Type of entrepreneurial activity	Women	Men
Have knowledge, skills & experience to start a business	30.0%	41.0%
Aware of good business opportunities	29.0%	41.8%
Personally know an entrepreneur	35.3%	44.3%

Source: Herringten, Kew & Kew (2009, Table 4.7, p. 69)

Three initiatives that support the development and strengthening of female entrepreneurship are worth singling out here. The first is the South African Women Entrepreneur's Network (SAWEN): SAWEN is a flagship programme of the Department of Trade and Industry where women economic empowerment is applied in an effort to enhance their participation and contribution in the economy. SAWEN brings together women groups to address the unique challenges that face them. The program is in direct response to the constitution in terms of contributing to gender equality and access to resources. SAWEN is also South Africa's response to the Beijing Platform Action Plan of 1995. The program's strategic objective is that of strengthening the participation of women associations in the policy dialogue. As an umbrella body, SAWEN aims to represent and articulate the aspiration of all women entrepreneurs in South Africa by working closely with like-minded organisations and associations from various sectors of the economy in a concerted and structured fashion.

The second is called the Technology for Women in Business (TWIB), which, since 1998, has helped women apply technology to support and grow their businesses, thereby assisting in the mainstreaming of women's businesses within the broader South African economy. TWIB was introduced to accelerate women's empowerment and women-owned enterprise development through the facilitation of technology-based business applications and systems and in the process, unlock constraints to enterprise innovation and growth, as well as local and global competitiveness. TWIB's mandate extends to programmes that encourage girls to choose careers in engineering, science and technology by facilitating access to educational information, career opportunities, academic and extramural learning programmes, and by creating successful female role models.

Lastly, the Isivande Women's Fund (IWF) is an exclusive women's fund established by the Gender and Women Empowerment Unit at the Department of Trade and Industry, in partnership with the Old Mutual Masisizane Fund. The fund aims at accelerating women's economic empowerment by providing affordable, usable and responsive finance than is presently the case. IWF targets formally registered, 60% women owned and/or managed enterprises that have been existing and operating for two or more years with a loan range of 30 000 - 2 million (www.thedti.gov.za/economic_empowerment/women_empowerment.jsp).

Participation of women in sector-value chains: The example of agriculture

Tables 74 and 75 summarise the share of men and women in the agricultural value chain, across the three sub-industries of primary agriculture, agro-processing, and retail and wholesale trade in agricultural products. However, there is not really a decrease in female representation as one move up the value added chain although women are better represented in the processing of agricultural raw materials / manufacturing of products (49%) than in the actual production of raw materials (34%). Both men and women are predominantly formally employed in all three sub-industries. Slightly more women than men are informally employed in both the agro-processing (11.4% versus 4.8%) and the wholesale and retail trade of agricultural products sub-industries (9.1% versus 7.2%), while slightly more men than women are informally employed in the agriculture sub-industry in 2009 (9.0%

versus 2.9%) (Hart et al., p. 49). Moreover, low skills requirements are characteristic of all three sub-industries and apply to both male and female workers. Low skilled women are particularly prominent in the agro-processing sub-industry, as they comprise 32.5% of all agro-processing workers.

Table 74: Share of men and women across the agricultural value chain (in three sub-industries) in terms of employment, 2009

Agricultural value chain	Share	Sex
A. Primary agricultural production		
Men in informal sector	9.0%	Men: 66%
Men in formal sector	57.2%	
Women in informal sector	2.9%	Women: 34%
Women in formal sector	30.9%	
B. Agro-processing		
Men in informal sector	4.8%	Men: 51%
Men in formal sector	46.3%	
Women in informal sector	11.4%	Women: 49%
Women in formal sector	37.5%	
C. Retail and wholesale trade in agricultural products		
Men in informal sector	7.2%	Men: 54%
Men in formal sector	46.6%	
Women in informal sector	9.1%	Women: 46%
Women in formal sector	37.1%	

Source: Hart et al. (2010, Table 44, p. 144)

Table 75: Share of men and women across the agricultural value chain (in three sub-industries) in terms of skills level, 2009

Agricultural value chain	Share	Sex
A. Primary agricultural production		
Men with high skills	1.6%	
Men with intermediate skills	10.2%	Men: 66%
Men with low skills	54.4%	
Women with high skills	0.7%	
Women with intermediate skills	3.8%	Women: 34%
Women with low skills	29.2%	
B. Agro-processing		
Men with high skills	1.7%	
Men with intermediate skills	23.3%	Men: 51%
Men with low skills	26.2%	
Women with high skills	0.9%	
Women with intermediate skills	15.4%	Women: 49%
Women with low skills	32.5%	
C. Retail and wholesale trade in agricultural products		
Men with high skills	1.6%	
Men with intermediate skills	20.7%	Men: 54%
Men with low skills	31.4%	
Women with high skills	0.5%	
Women with intermediate skills	19.7%	Women: 46%
Women with low skills	26.1%	

Source: Hart et al. (2010, Table 44, p. 144)

Dimension 11: Women and Lifelong Learning

Lifelong learning, according to *Wikipedia*, is the continuous building of skills and knowledge throughout the life of an individual. It occurs through experiences in the course of a lifetime, and these experiences can be either formal (training, apprenticeship, higher education, etc.) or informal (experiences, situations, etc.) (http://en.wikipedia.org/wiki/Lifelong_learning)

In South Africa there are various formal institutional arrangements for strengthening lifelong learning among adults. For instance, Adult Basic Education and Training (ABET) is available to adults who wish to complete their basic education, by completing different levels of training that correspond to Grades R to 9 of the general school education. Further Education and Training (FET) colleges, on the other hand, provide adults and early school leavers with an opportunity to complete the last three years of general school education (Grades 10 to 12) and also offer post-school vocational and occupational training. The focus of training by FET colleges is on the attainment of marketable skills. Moreover, higher education institutions in South Africa (the public universities) also provide opportunities for lifelong learning to adults and are increasingly doing so as they offer distance programmes and online modules. One university, the University of South Africa (UNISA), dominates distance higher education in the country as it is primarily a distance learning institution.

Table 76 below shows women as a percentage of all adults who were attending these three categories of educational institutions in 2010. An age criterion of 26 years and older has

been introduced, which means that the general student population (16-25 years) is excluded. As can be seen 89% of all adults who attended literacy classes in 2010 were female. It thus appears that more women than men are upgrading their basic educational skills. It could also be that more women than men are lacking basic education and for that reason are reflected in higher attendance figures. The same applies to the observation that 84% of all ABET centre attendees are women. Women also constitute the larger share of 26+ year olds attending FET colleges and universities.

Table 76: Women as percentage of all 26+ year olds attending an educational institution, 2010

Educational institution	Percent of women
Literacy classes	89%
Adult basic education and training learning centre (ABET)	84%
Further education and training college (FET)	67%
Higher education institution	53%
Other college	49%

Source: Calculated from Stats SA (2011a, Table 3.2, p. 65)

If one considers the share of women among all students enrolled for distance programmes at South African universities it is clear that this mode of university training is increasingly becoming attractive to women (Table 77). The female share of distance university students has been consistently growing, from 56% in 2001 to 60% in 2009. However, it needs to be mentioned that non-South Africa students are also reflected in the university figures.

Table 77: Women's share of students enrolled for distance programmes at South African universities, 2001 to 2009

	2001	2002	2003	2004	2005	2006	2007	2008	2009
% female students	56%	56%	56%	56%	57%	58%	59%	60%	60%

Source: DBE (2010, Figure 18, p. 32); DoE (2003, Figure 24, p. 40); DoE (2004, Figure 24, p. 36); DoE (2005a, Figure 18, p. 30); DoE (2005b, Figure 20, p. 33); DoE (2006a, Figure 20, p. 33); DoE (2008, Figure 20, p. 34); DoE (2009, Figure 20, p. 34); DoE (2010b, Figure 18, p. 34)

Unfortunately, as far as could be detected, no sex-disaggregated statistics are available in the public domain with regard to other formal and informal means of lifelong learning (e.g. visits to public libraries, telecentres, etc.).

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