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Federal Ministry
of Education
and Research

WOMEN IN INDUSTRIAL RESEARCH

SPEEDING UP CHANGES IN EUROPE

International Conference

2004

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Foreword

Philippe Busquin
EU Commissioner
for Research

In the present situation, where progress towards the Lisbon and Barcelona targets is proving slow, Europe needs to mobilise more financial resources and to make better use of its human resources. There is a need for an additional 700,000 researchers in Europe by 2010; the majority of these will be working in the private sector. Without better development and use of the potential of highly qualified women, Europe will be unable to meet this target.
In Berlin, together with more than 350 experts, we discussed which steps need to be taken to speed up changes in Europe. Concerted actions are needed if the number of women researchers in industry is to be quadrupled by 2010, as the high-level expert group on Women in Industrial Research has suggested.
Andrew Gould, CEO of Schlumberger Ltd., presented a position paper in which seven CEOs from research-based companies committed themselves to take action in five key areas. Industry has taken the lead in promoting changes, but a radical change of the research culture is needed in academia, too. Educational institutions and society as a whole must mobilise more women for research in Europe.
The results and recommendations presented in this publication provide an important basis for launching action at European, national, regional and institutional levels. The action plan will be followed up in cooperation with Member States, the enterprise sector and public institutions.
I would like to thank all those who participated in the preparation, organisation and discussions of the conference.

Philippe Busquin
EU-Commissioner for Research

Edelgard Bulmahn
Federal Minister
of Education
and Research

I am delighted with the great interest which German and European companies showed in the conference entitled "Women in Industrial Research - Speeding up Changes in Europe" which took place in Berlin on 10 and 11 October 2003. 350 experts of both sexes discussed how more women can be encouraged to enter industrial research in Europe on a long-term basis.
Everyone agreed: We must improve the innovative ability of the European research area if we are to be able to compete in the international competition. Only by fully engaging the existing potential of female researchers will we be able to meet the challenging objective of creating innovations and shaping a modern society. We must succeed in establishing a culture which not only accepts the changing role of women in today's society but also recognizes and takes advantage of the opportunities which this entails.
The expert report presented within the framework of the new EU initiative on strengthening the involvement of women in industrial research (Women in Industrial Research - WIR) has made the need to act very clear and calls for concerted actions. The necessary changes will only be possible in cooperation between men and women from science, industry and politics. The best strategies must be compared, discussed and implemented.
The conference " Women in Industrial Research - Speeding up Changes in Europe" was a big step forward along this path.

Edelgard Bulmahn
Federal Minister of Education and Research

Conference Proceedings

WOMEN IN INDUSTRIAL RESEARCH

Speeding Up Changes In Europe

International Conference

Co-organised by

EU-Bureau of the BMBF, PT-DLR
Contact Point "Women into EU-Research"

Unit Gender Equality in Education and Research,
Federal Ministry of Education and Research,
Germany

Federal Ministry
of Education
and Research

Unit Women and Science, European Commission,
DG Research

Women
in Industrial Research

Summary

Results and Recommendations:
The WIR conference at a glance

More than 350 experts from over 40 countries, mainly from industry, but also from research institutions and organisations, academia, national governments, international organisations and statistical offices met in Berlin to discuss how to enrich European research and competitiveness by recruiting, retaining and promoting more women in industrial R&D. There was a clear consensus that there is an urgent business need to improve gender diversity in European research.

Discussions on good practice and effective strategies drew upon the WIR -report: Women in industrial research. A wake up call for European industry, which presented data for Europe for the first time, introduced by Prof. Dr. Helga Rübsamen-Waigmann (Bayer AG), who chaired the expert group and the rapporteur, Prof. Dr. Teresa Rees (University of Cardiff). This information has been supplemented by the WIR- study: Women in industrial research. Analysis of statistical data and good practices of companies, presented by Prof. Dr. Danièle Meulders (Université Libre de Bruxelles), who headed this international research project, and the publication: Women in industrial research. Good practice in companies in Europe, which presents company-level data, examples of good practice, and role models from 20 companies and private non-profit research institutions from 12 different European countries.

Europe needs more women in industrial research - and more women studying science and engineering.

In his opening speech Commissioner Philippe Busquin, DG Research, stressed that Europe will need 700,000 additional researchers within the next few years to realise the 3% R&D target set by the European Council in Barcelona in Spring 2002. Industry already employs the majority of EU-based researchers and there has been a major increase in the employment of women researchers and engineers in industrial R&D in recent years (33% from 1995 to 2000). But still the proportion of women researchers in industry is only 15% in the EU (ranging from 9% in Austria to 28% in Ireland and for the associated countries from 16/17% in Switzerland and Czech Republic to 55% in Latvia).
Wolf-Michael Catenhusen, Permanent Secretary of State of the German Federal Ministry of Research and Education, urged the companies to recruit more female researchers. He also underlined the necessity of improving child-care provision, especially in Germany.

CEOs take the lead: The urgency of the business case!

Andrew Gould, CEO of Schlumberger presented the changes that his company has already implemented and launched a "Wake up call from CEOs", which is the commitment of a group of companies who spearhead international R&D to enlarge the reservoir of talent in Europe, to double the number of women in science and engineering, and to ensure that their skills are used by industry to the best advantage. These companies share a vision in which women play a much more important role in decision-making in industrial R&D. They have committed themselves to co-operate by putting this issue on the public agenda.

The CEO and top management of each signatory company will

1) take a stand and demonstrate their company's approach at public events
2) sponsor a women professor in science/engineering as a role model to promote strategic partnerships with the education sector to encourage women in science and engineering
3) promote change within their companies and through co-operation with other companies and universities
4) make use of existing national and international programmes to support women in industrial research
5) analyse the business case to strengthen internal and public communication.

The CEOs of AIRBUS, AIR LIQUIDE, EADS, HEWLETT PACKARD, ROLLS ROYCE, SCHLUMBERGER and SIEMENS have already signed this commitment. Several other companies and research institutions have expressed their intention to join. This group will put forward examples of best practice and set standards. In the final session of the conference, Susan Bowick (Executive Vice President Personnel, Hewlett-Packard), Gill Gordon (Director Personnel, Schlumberger) and Dr. Peter Ramm (Vice President Policies and Legal

Issues for Global Personnel, Siemens AG) explained the business case for gender diversity and why their companies take action.
In five workshops and plenary sessions recent studies and good practices have been presented and discussed in order to recommend key activities and further steps. All workshops were chaired by high-level executives of R&D based companies and members of international R&D advisory boards and organisations. The rapporteurs and the majority of speakers were representatives from industrial research.

The main conclusion was that promoting women in industrial R&D is central to the business case and needs firm commitment from the top.

The CEOs signing the position paper has shown their endorsement.
In order to further promote the case it is necessary to:

- stimulate debate on international, national, regional, and institutional level,
- agree on targets for future development,
- identify good practices and learn from the best,
- combine quantitative and qualitative analysis,
- develop clear benchmarking indicators and measure progress,
- implement strategies and adopt good practices,
- concentrate activities on cross-institutional and international level,
- establish a European information gateway on the internet, and
- organise a follow-up conference.

Results and Recommendations of the five workshops

Workshop 1
Young Scientists - How to motivate more young women to pursue careers in industrial research?

What can companies, schools, universities do?

- Motivate more girls to become interested in science and engineering, in a similar way to the German initiative: "Girl´s Day", where this year more than 100,000 girls aged 12-16 visited nearly 4,000 companies, research institutions, and universities. This model could be usefully transferred to an international or European level.
- Some universities have been very successful in raising the proportion of women students, especially in electronic engineering, machinery, computer sciences and physics to about 40%, while others only reach 3%. These successful examples should be made more visible by an international ranking of the most successful institutions.
- The lack of women professors means that there is a lack of of role models for young women in these disciplines. The percentage of female professors should therefore be monitored and published at institutional level.
- Exchange experiences, strengthen international networking, and train ambassadors for women in engineering and ICT: the International Summer University of Women in Engineering (IIWE, Paris, including role models from 50 countries) is an excellent example which others should join.
- Transfer successful mentoring and internship schemes for female students in science and engineering like the YOLANTE network of Siemens; such examples should become more visible and their adoption by others should be promoted.

Workshop 2
Careers for women in industrial research and good practices of companies.

What can companies do to promote women, to change the culture of research, the framework conditions and to have more women at the top levels?

- The Diversity Champions Network of the Diversity and HR Managers of R&D companies should be established at European level to promote and monitor change.
- Alternative career patterns should be supported: time limitations should be assigned to management roles, job rotation would allow researchers to go back into research after a period of management tasks. Career breaks should be accepted and encouraged not only for child care but also, e.g., for further training;

changing the levels of acceptance of the culture of flexible working hours and part-time work,
- to promote work-life-balance and dual careers, successful initiatives like Partnerjob.com should be transferred to international and inter-sectoral level and extended also to public research organisations and academia,
- to promote change and increase transparency and visibility of successful strategies, a European award "Best place to work for women in R&D" should be developed and implemented.

Workshop 3
Enhancing the participation of women in innovation and entrepreneurship.

What can be done to increase the number and participation of women in the innovation-process?

- Widen the debate on Women in industrial research by innovation, entrepreneurship and ICT,
- start early, with information and training of girls and female students on women entrepreneurship. Management skills should be part of the curricula in science and engineering courses,
- promote realistic role models, specifically success stories of innovative/high-tech women entrepreneurs and foster mentoring for women entrepreneurs,
- pay attention to the issue of access to finance for growth-oriented women entrepreneurs and women entrepreneurs in innovative and high-growth sectors, matching private funds with public money,
- organise a yearly conference with special focus on women and intellectual property in co-operation with the European Patent Office,
- provide statistical data and analysis on women entrepreneurs in innovative and high-tech sectors,
- create a European office of women's business ownership with regional/national offices, which coordinates, assembles and distributes information on national activities, programmes, role models, develops a marketing strategy to promote the visibility of (innovative) women entrepreneurs, and commissions research in case of lack of knowledge.

Workshop 4
Improving the knowledge base on women in industrial research.

What are the facts and figures? What needs to be done to have more gender-differentiated comparable data on firm level, sectors, countries? How can qualitative research be improved?

- Combine data collection with qualitative analysis and strategies to implement change,
- stimulate a debate on target-setting at institutional, national and international level,
- develop clear benchmarking indicators and measure progress,
- specify the needs of gender differentiated data with respect to the benefits for enterprises.

Workshop 5
Top women in industrial research - The relevance of role models, networking and mentoring.

What can be done to make women in industrial research more visible, more powerful and to change the public image of industrial research?

- Organise cross-company, cross-institutional and international career training for women scientists and engineers (improve information, networking, negotiating skills; examples are "fast tracks" in industry, or "springboards", such as senior positions-training in Germany and the US),
- develop mentoring schemes on cross-institutional and international level,
- change the public image of women in industrial research and increase visibility of women researchers in the media,
- initiate the publication of a top-50- list of women scientists in Europe,
- co-operate with media and women's organisations,
- include indicators on women in senior positions in private and public research in national and international benchmarking on women in decision making as well as on the proportion of women in science and engineering studies.

Political perspectives and final conclusions

The representatives of the European Commission, DG Research (Dr. Rainer Gerold, Director), the German Ministry of Education and Research (Hartmut Grübel, MinDirig), the Italian EU-Presidency (Prof. Dr. Francesca Cantù) and the French Ministry of Research and New Technologies (Michèle Baron) concluded the conference taking care to place this topic on top of the political agenda to put into action the Lisbon and Barcelona objectives and to invite national governments, companies, universities and private research institutions to take actions. All presentations of the conference are available on the WIR- Website:

www.europa.eu.int/comm/research/wir .

Acknowledgements

In October 2003 the Dresdner Bank Berlin, situated at the Pariser Platz, hosted the Conference "Women in Industrial Research - Speeding up Changes in Europe".

The conference building was designed by the architects Gerkan, Marg and Partners and opened in 1997. It offers space for more than 200 employees from many different business sectors, e.g. the Allianz Group, and the executive board of the Dresdner Bank and the management of the Dresdner Bank Region East.

Many people have been involved in the preparation and organisation of this conference and we would like to thank them all for their help, commitment and support, which made this conference possible. We would like to express special thanks to Ulrike Ufert-Hoffmann and Jürgen Bartsch, Director of the Dresdner Bank, for hosting the conference in their marvellous building at the Pariser Platz, giving the conference unique surroundings.
We would also like to thank the team of the EU-Bureau of the BMBF: Christiane Wehle, Katja Goertz, Monika Schuler, Klaudia Wallau and Christine Zirkel for the overall organisation; Nina Sartori and Cornelia Schneider for the preparation of the conference proceedings, the Gender Equality Unit of the German Federal Ministry of Education and Research: Christina Hadulla-Kuhlmann, Maria Brosch, Julie Klein and Hildegard Brandts, the Women and Science Unit at DG Research, especially Vera Fehnle, Valerie Gobbe and Marianna Major, as well as Rainer Gerold, Director Science and Society, Pierre Bismuth and Amy Simpson from Schlumberger Ltd. for setting up the CEO Initiative.

Contents

Part 1 - Opening Session

Research urgently needs the talents of women

Philippe Busquin
EU Commissioner
for Research

During the opening session of the conference, Research Commissioner Philippe Busquin talked about the Commission's role in improving the situation of women in research. "Knowledge is only valuable if it is measurable" he stated, stressing the importance of the data collected and analysed for the WIR Report. The questions were posed by Conny Czymoch, the moderator of this conference.

Philippe Busquin: I would like to welcome you all to this conference in Berlin. I am very glad that the German government has taken the initiative to organise this first conference on Women in Industrial Research in Europe. I also wish to thank the Dresdner Bank, which is hosting this conference and which have given us the opportunity to meet in a historical European location.

What is the Commission's role in acting and bringing further change to the situation of women in research? The report was one aspect of this work but what are the other, forthcoming initiatives? What fields of activity are we talking about?

Philippe Busquin: Women in science has become an important issue for the development of the European Research Area in recent years. In 2000, the first European report on women in science underlined the need for European policy to integrate the gender dimension into research policies and programmes and to improve statistics on women in science[1] in order to develop indicators for benchmarking. Already at the end of 1999 the lack of data on women in industrial research was obvious. The Commission took the conclusions of the report seriously. We understood that it is important to improve the participation of women in European research, that there is a need to integrate the gender dimension into research programmes and projects and to ensure a stronger involvement of women. We understood that this is also important in the evaluation of research programmes which depend on the gender perspective.
The new Women in Industrial Research (WIR) report underlines this view when it states that more women should be involved in decision making. It is important that aims are also set by women for certain types of research because women might perceive some objectives and strategies differently from men.
To clarify, this is an issue where all stakeholders are challenged. The Commission does not only ask companies and research institutions to promote women in science and support their career development. We all need to support women: DG Research in its departments as well as national governments and public research organisations.

Why did you single out the private sector?

Philippe Busquin: As a scientist I know that knowledge is only valuable if it is measurable. We have already heard this. The specific problem in industrial research has been that we did not even know how many female researchers worked in this sector. For the public sector we have more data and we have a clearer perception of what is done at national and European level, not least because of the work of the Helsinki group on Women and Science[2] This approach generated its own dynamic. Of course, comparability of data between Member States and transparency must be increased. But, even with limited comparability, if you find out that your country is underperforming, of course you want to improve the situation. That is one reason why such data and reports are important. The Helsinki Group has presented an excellent report on the public sector, but with regard to the private sector we did not have much information. Today, thanks to the WIR report our knowledge has increased. We know that in the private sector, unfortunately, women in re-

1Osborn, Mary et al (2000) Science policies in the European Union: Promoting excellence through mainstreaming gender equality, Luxembourg: Office for Official Publications of the European Union

2Set up by the European Commission in November 1999, comprised of civil servants and gender experts from the EU Member States and all countries associated to the Research Framework Programme

search, especially in top positions, are even less visible than in the public sector. Their share amounts to a mere 15% which compares unfavourably to just over 30% in the public sector. It indicates that progress in industrial research is even more urgent and that the barriers might be different and higher.

Did it surprise you that it was only 15% of women in industrial research?

Philippe Busquin: Not really. We were already expecting this. But we needed to be able to measure it, to have an objective view and to understand the underlying factors better. That makes the WIR report so important. I'd like to stress once more the good work and the fast work of the expert group. In January this year, I received the report, which also underlined the determination of companies to assume a more active part in this initiative. I would like to thank the representatives of Schlumberger who have taken the initiative to create a group of CEOs which will take the lead to promote the necessary changes.

Now certain parts of industry have already reacted to the results of the report that was published more than half a year ago. Apart from industry taking up the idea, have there been any more initiatives from the EU side to further the cause?

Philippe Busquin: Yes. Within the European Union, we have the Sixth Framework Programme for Research, which provides about 5% of all research funding in Europe and it has a strategic dimension to design and shape future research in Europe.
In the Sixth Framework Programme for Research, gender mainstreaming has been introduced. We ask for information on the inclusion and position of women in research from those who submit proposals. For Networks of Excellence and Integrated Projects a Gender Action Plan must be submitted with the proposal. However, this must not affect the most important selection criterion for projects which is excellence. But that does not contradict equal opportunities or female participation, there are excellent women in research, thus women's participation has also become a consideration in the context of excellence.
In the Fifth Framework Programme for Research we raised the number of women in the evaluation panels to 27%. This was progress, but we need to progress further in order to reach our 40% target, which is, as I may point out, higher than the overall level of participation of women in research at present.

What is the significance, what do you expect from this conference?

Philippe Busquin: Firstly, the conference is taking place so soon after the first results of the initiative have been presented by the Commission, which is a great achievement. Secondly, the results of a statistical analysis and good practice examples are already available as well as the report of the high level expert group on women in industrial research.
Thirdly, the results of the discussions will sustain the dynamic which has been generated and will give additional impetus to the process.
Of course, progress in industrial research needs the cooperation and commitment of industry and companies. The companies of the CEO group will act as role models for other companies. The main players have started moving. We, the Commission and the national governments, can push this process. We can inform and propagate the strategies of companies, but in the end it is up to the companies themselves to implement changes. In their own interest, companies recognised that there are many very talented women, equally as talented as men, and that they need these resources.
Prospects will become better for women and that will also benefit research.

Monsieur Busquin, merci.

The venue of the conference: The "Rotunde" of the Dresdner Bank in Berlin

Opening the door to a successful career

Wolf-Michael Catenhusen, Permanent Secretary Ministry of Education and Research

Mr. Catenhusen, as BMBF representative you will certainly be proud that the conference is now taking place in Berlin?

Wolf-Michael Catenhusen: Yes, I am, and for a number of reasons: It was the personal wish of the German Research Minister, Ms. Bulmahn, to bring this conference to Germany, because a lot remains to be done in Germany with regard to the representation of women in research. We hope that this conference will send out a signal to the decision-makers in politics, science and industry to change the status quo. A country like Germany can only truly satisfy its demand for qualified staff when women are represented to a far greater extent in leadership positions. Furthermore, on the German side we can be proud that Professor Rübsamen-Waigmann has chaired the expert group "Women in Industrial Research". I am aware of the incredible career she has made under the given circumstances in Germany. She is a role model for younger women in Germany; she has demonstrated that it is possible even for women in Germany to climb up the career ladder.

Do you share the optimism of the previous speaker that an equal number of women and men in industrial leadership positions will be found in Germany in 2020?

Wolf-Michael Catenhusen: I know that this is a very demanding task and would like to give an example from politics: In Germany, some parties have introduced a quota in 1988, and we now have overcome the situation that women in politics only serve as an alibi. Due to the current demographic development, we will only be able to develop our high-tech knowledge based society further if we fully use the potential of qualified women in leadership positions. In the future, Germany will need the potential of qualified women; otherwise we will have to attract skilled employees from all over the world under a "brain gain" initiative, and this is not a viable compensation. There is the potential, the qualification of women up to the PhD level. We must open the doors and provide women with career opportunities. We must be bold enough to bring women in their early thirties into leadership positions in order to speed up the generational shift. The policy of the Federal Ministry of Education and Research actively supports women in research, for example by establishing competence centres or supporting the "FemConsult" database, where female scientists in all disciplines can be registered at national level.

And the question about role models ?

Wolf-Michael Catenhusen: We are trying to bring women in leadership positions in publicly financed research. This requires a human resources policy which pursues the objective of attracting women and of building them up for leadership positions. We have created the necessary legal framework conditions at the research institutions. However, there is another important point: We also need men in our society who demonstrate that they want and actively support this process. Because what convinces men is other men who support this process not because they are forced to but because they believe it is the right way. This starts with equal opportunities in leadership positions, but it also means a new kind of partnership. The Federal Ministry of Education and Research has come up with some measures to improve opportunities for people to balance work and family, for example it is funding an all-day school programme and supporting day-care facilities at research institutions.
In the end, women must fight their way through the process to equal opportunities by means of self-organization and networking, because there will be, of course, growing competition between men and women once women are moving up to leadership positions. We do have the achievement principle. But I hope that more younger men nowadays are aware that this process is imperative.

Mr. Catenhusen, thank you very much.

A wake-up call from CEO´s

signed by the CEO´s ofAirbus, Air Liquide, EADS, Hewlett Packard, Rolls Royce, Schlumberger, Siemens

This position paper is a joint, public commitment of Chief Executive Officers of companies based in Europe, who are eager to enlarge the reservoir of talent in Europe[1]. We want to see, in the first instance, twice as many women graduating in science and engineering. At the same time, we want to ensure that their skills are used by industry to the best advantage. We sense an urgency to tackle this problem, but we also need to make a commitment to longer-term strategies.
Our companies have different cultures and operate in a diverse range of industries and countries. We are also at different stages in developing policies to recruit, retain and promote women effectively and efficiently. However, we all want women to play a much more important role in decision-making in industrial R&D and we are committed to working together to put this issue on the agenda publicly.
We are ready to take the following actions:

- **Taking a Stand: Each CEO and their top management will demonstrate their company's approach at public events.**
- **Sponsoring a Role Model: Each company will fund a major programme, such as endowing a Chair at a university, to create a strategic partnership with the education sector to encourage women in science and engineering.**
- **Promoting Change: Each company will be a catalyst for change: internally, by promoting awareness, initiating or improving specific company measures, defining strategic goals and monitoring progress; and externally, through co-operation with other companies and universities.**
- **Making Use of Existing Programmes: Each company will take full advantage of existing national and European programmes designed to support women in industrial research.[2]**
- **Analysing the Business Case: A panel of experts (sociologists, economists, scientists, etc) will review existing research, analyse the results and assess the business case today to strengthen public communication.**

We should also like to trigger changes in the perceptions of women in high school and university, and throughout their careers. These changes are designed to encourage them to take up and pursue careers that will lead to the strengthening of the science and engineering workforce. This will require a contribution from a range of partners in society - primary and secondary education, government and public and private sector industry. We hope that our actions will produce a snowball effect on these other sectors of society.
We are working together as a group to make an impact. The challenge is an exciting one; addressing it successfully will enrich and diversify our corporate cultures. We are committed to sustained action on all of these initiatives. We are aware that these actions will demand investment; yet to do nothing would cost much more.
We welcome other companies that are joining us in this venture and we look forward to working together on this long and interesting journey.

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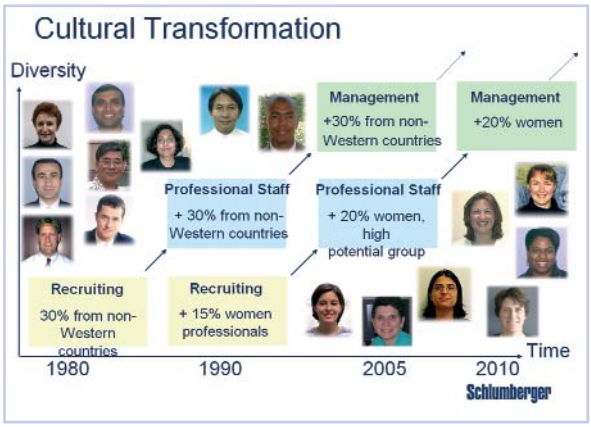
[1] Rübsamen-Waigmann, H. et. al. (2003) Women in industrial research: A wake-up call for European industry Luxembourg : Office for Official Publications for the European Communities

[2] Example: Marie Curie Actions in the Sixth Framework Programme of the European Commission (http://europa.eu.int/mariecurie-actions)

Waking up to the need for women in science and technology

Andrew Gould
CEO
Schlumberger Ltd.

Your Excellencies, Ladies and Gentlemen,
it is an honour to be here. Taking a proactive stance in this sort of domain is never easy, and no organization is better suited to understand that than Schlumberger.
About 25 years ago, the chairman of Schlumberger decided that the company's engineer workforce, which at that time largely consisted of French and Americans, should represent all the countries in which we work in proportion to the number of engineers required by the activity in that country. This reasoning was business-driven; as a global company, interacting with our customers required hiring people from their respective cultures. We sell complex technology, and the cultural affinity that diversity has achieved with our customers is a major competitive advantage.
A condition of the success of this idea was that opportunity would be equal irrespective of one's nationality. It is possible that I will be the last European or American CEO of Schlumberger, as the top management group of Schlumberger today comprises 23 people representing 11 nationalities. Our belief that opportunity is truly equal has given us access to the best people no matter where they were born, and the result is an extraordinary melting pot of talent.
Within all levels of the company, there are people of many different nationalities. We monitor them from recruitment onwards, throughout their careers, tracking them with highly focused succession-planning mechanisms. This does not mean that we have uniform success. Many countries in which we operate, particularly in less-developed parts of the world, either have small populations or poor educational systems, and these present significant challenges. Aligning our business with our needs identifies focus areas for recruitment as our industry evolves, and this has led us to our current efforts in Russia and China- two countries that are vital to our future.
Why do I emphasize our success in nationality diversity? It is simply because so many of the tools and so much of the know-how about gender diversity are contained in our past successful experience with nationality diversity. The real key now is to capture experiences from one generation to the next and to encourage interaction. Overcoming natural prejudice and the defence of the status quo took us many years, much effort, brilliant successes and painful failures to reach where we are today. Yet, the overall result is a spectacular success not just in terms of diversity but also in the positive impact on our business. When you can offer a customer in the Middle East, or in Latin America, a Schlumberger manager trained to the highest international standards and of the same nationality as that customer, you have a credibility that would never be accorded an expatriate foreigner.



Cultural diversity. Transforming the culture of a company takes 10 to 20 years.

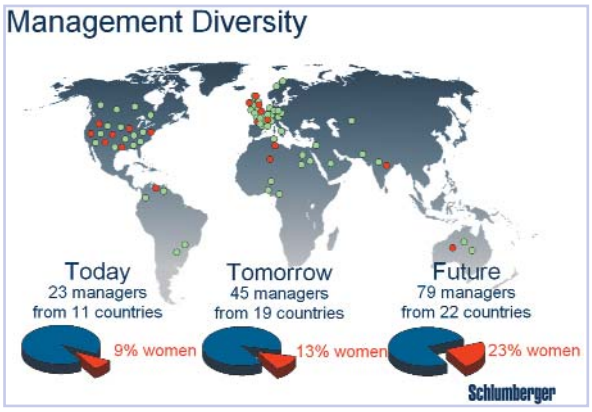
In 1994, we decided that we needed to bring the same focus to gender diversity that we brought to nationality diversity. There had previously been isolated and sporadic attempts, but with little sustained success. Once more, the reasoning was business-driven- ´ why deprive the company of access to half of the world's intellectual potential? Again, we faced the same resistance and prejudice. In fact, on many occasions, I presented to managers from countries all over the world the same arguments that we used with the French and American engineers who resisted diversity 20 years ago.
As you can see from the succession-planning charts, women have begun to make inroads, but in my

view we are still at a stage where the ultimate success of the undertaking is fragile. I will devote the remainder of my remarks to discussing why this is so and what needs to be done to consolidate the advances we have made. But first I would like to make one short digression. While the business case for nationality diversity was not obvious, the business case for gender diversity is not only obvious; it is essential. By way of illustration consider these facts:

- 70% of the intake to the School of Medicine at Imperial College in London is female. In fact, 70% of the intake to life science disciplines is female.
- Before too long, half the 35-year-old lawyers will be women. How then will any corporation be able to maintain its legal department if it does not accommodate women's requirements in terms of their desire to have children as well as the correspon ding benefit packages?
- The acceptance of women in all branches of university education and their spectacular educational achievements have made the commitment of women to the workplace and the commitment of society to keep them there inevitable. It is in the interest of society at large to ensure that the per sonal and professional needs of women are satisfied.
- As Christopher Caldwell wrote in the Financial Times, "In 2020, women will not have to shout their demands. Any company that wishes to stay afloat will anticipate them."

Success stories and role models are important. Pioneers and explorers have always made the way easier for those who follow, and their experience is a roadmap of success or failure to be followed or discarded. I would like to share the examples of three successes in Schlumberger. These women are fully aware that I am using them as role models today and have given enthusiastic support to my participation at this event.

Carol is a proud, opinionated, outspoken, positive computer scientist. She has developed software for complex acquisition and interpretation systems for 22 years. She has progressed from software engineer to section manager, and she is excellent at motivating tightly knit teams. Carol is a pragmatic and



Succession Planning. With the current composition of our management staff, we expect the proportion of women in management to increase from 9% now to 13% in the short term, and to 23% in the longer term.

realistic project manager comfortable talking to anybody in the company. It is this straightforwardness coupled with her sense of humor that earns her tremendous respect and loyalty from many people in Schlumberger.

Catherine is the general manager for Schlumberger Oilfield Services in Canada. I first met Catherine 13 years ago when she was the field engineer on an offshore platform in Nigeria. She was managing a team of three Nigerians and $2 million of Schlumberger equipment, and was helping make key technical decisions for her customer. At the time, this was a relatively unusual position for a young woman in her early 20s.

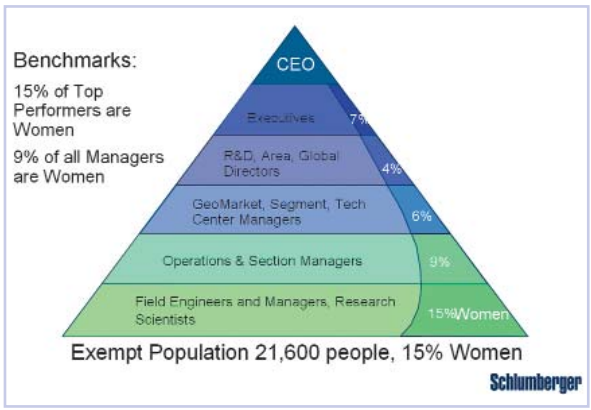
She married another Schlumberger engineer and has been a pioneer in the management of dual careers, maternity breaks and the other policies that are associated with gender diversity. She specifically noted for today's session that she considers it is not so much new policies that are needed but instead, more flexibility on the part of the company.

Catherine is one of three female general managers in an overall group of 27 who manage Schlumberger field operations worldwide. While 3 out of 27 may not represent a critical mass, it is a voice that is heard.

Roopa is a geophysicist and a leader. She began her career 22 years ago as a senior development engineer working in an Interpretation Development group in Houston, Texas. After three years, she moved to Operations in the Far East, spending the next seven years in Singapore, Bangkok and Kuala Lumpur. She made significant technology introductions

to the field and speaks very highly of her experiences training field engineers and interacting with customers. Roopa vividly remembers her manager at the time, a man who initially believed that women belonged either in research or in the home- not in the field. However, after working together for a year, he became her greatest supporter.
Today she is a scientific advisor and business development manager involved in complex oil-production projects.
The women I mention today are exemplary role models. One is a software expert and R&D manager; the second a field operations manager; the third a scientist and sales expert. All are mothers. Each of them makes a big difference in our company. They have in common their strong personalities and communication skills (however different in style), well-rounded professional development and well-balanced work and life-styles. Each is an inspiration to the engineers and scientists in Schlumberger.

After nine years of promoting gender diversity within Schlumberger, success is not uniform but considerable advances have been made. Fifteen percent of our exempt employees are women, and 9% of our managers are women. As you can see from this pyramid, 15% female intake at the entry level of field engineer, research scientist or product engineer gives us a considerable population, as this represents 2500 women in total. It is the next stage that is the challenge; providing an environment that gives women confidence that they can have a range of career opportunities within a framework that satisfies both professional and personal aspirations.



Women in technical careers today at Schlumberger

In this context, I would like to mention what to me are the most difficult aspects of achieving this.

- As always, if management is not committed at all levels, it will not happen. I am convinced that top management and much of the middle management of Schlumberger are committed, but the attrition statistics, particularly for female field engineers, suggest that commitment is not total across all management levels.
- We need to adjust our policies and proce dures in such a way as to convince women and their partners that we truly want to retain them. This goes beyond the traditional need to adapt policies to maternity, life-style and continuity. A key issue that is both highly personal and not easily adapted to a policy or system is that of dual-career couples. In these cases, a point is often reached where the career opportunities for one will take precedence over those of the other. I know that conventional wis dom marks this as a point at which the man's career often takes precedence, as they are normally slightly older and more advanced in their careers. I believe that today's cou ples are capable of assessing their professional situation and of deciding who has the most promising career and living with the consequences. Academia, industry and government will need unprecedented voluntary co-operation to solve this issue.
- Finally, we must consider the glass ceiling- that invisible barrier to advancement that keeps women from attaining the highest levels of corporate management. Curiously, the glass ceiling is a phenomenon that is not only a male creation. Women are more cautious about taking career risks than men, and also are abhorrent of the stigma that might come from "risky" promotions that could be perceived as quota adherence, or making the numbers, rather than promotion truly based on merit. Many believe that women are less assertive and less likely to ask or negotiate than men. A new book by two American women, "Women Don't Ask: Negotiation and the Gender Divide," documents this phenomenon. Those of us who managed promotions in the nationality diversity phase of Schlumberger and who

have dealt with different cultural conventions are well aware of this. However, the glass ceiling is a real problem and will remain so until women achieve critical mass within the management ranks. It is the biggest challenge we face in gender diver sity today and for the next five years, nowhere more so than in research and engi neering. I have no doubt the ceiling will be broken, but it will take all our support and attention.

Women in research and development at Schlumberger

Schlumberger currently employs 3250 scientists and engineers in our research and product centers around the world. Most are in the USA, but we have significant populations in France, the UK, Norway and Japan, and small populations in Beijing, Moscow and Saudi Arabia, where, against all expectations, we have a female Saudi Arabian biochemist, educated at Cambridge, as a full-time employee in research. This somewhat belies the traditional image of the Gulf, but the progress women are making in science in the Muslim world is not insignificant.

In terms of R&D management, we have one female product center director, who is working in Norway. We have 13 female section managers (out of 218) in our research laboratories and 9 female project leaders (out of 76) in our product centers, covering disciplines as diverse as nuclear spectroscopy, magnetic resonance, geophysics and application software. I am not proud of these statistics, and we have considerable progress to make in this area. We have women who have made important business contributions through the technology they have developed and women who have received prestigious awards from professional societies. Marcia McNutt, the head of the Monterey Bay Aquarium Research Institute, is a member of our external science committee. The president-elect of the Society of Petroleum Engineers, Kate Baker of BP, shows that even in the oil and gas industry, significant barriers are falling.

So what is the solution for research? In my view, it is in creating the necessary conditions that favor the enrollment of women in sciences other than life sciences, and also in favoring their retention throughout various stages of their careers. Once we achieve this, time and concerted efforts from us all will do the rest. The challenge of creating the right conditions goes beyond the universities and back to the secondary schools across the continent. In my opinion this is not a problem that is limited to research. Attracting women to a breadth of science and engineering careers is important to the future industrial competitiveness of Europe. We all need to do what is necessary to ensure that women are as attracted to science and engineering within academia, industry and the public sector as they are now attracted to life sciences or the law.

I am therefore delighted to participate in this forum and to commit Schlumberger to the agenda that you see here. I believe that we are in very good company and apart from these seven companies already committed to act: Airbus, Air Liquide, EADS, Hewlett- Packard, Rolls Royce, Schlumberger and Siemens, I can report that at least five others are preparing their contribution.

I am particularly pleased to see that the program actively encourages industry to sponsor a female professorship at a university. It is only when young women feel that scientific research and engineering provide an exciting, viable and sustainable career in academia, industry or the public sector that we will attract and retain them in significant numbers. The other issues-promotion, career and family considerations-in my view will solve themselves as time and numbers make women's contributions essential and both demographically and educationally unavoidable.

A wake up call for European Industry: Presentation of the WIR report

Prof. Dr. Helga Rübsamen-Waigmann
Bayer AG

Professor Helga Rübsamen-Waigmann, chairwoman of the High Level Expert Group on Women in Industrial Research, presented the main results and recommendations of the report "Women in Industrial Research - A wake up call for European Industry".

Introduction

The WIR expert group was set up by the European Commission, DG Research, and began its work in January 2002. Exactly one year later the final report was presented to Philippe Busquin, EU-Commissioner for Research, and to the general public.
The starting point was the total lack of data on women in industrial research. Data exists on women in publicly funded academic but not industrial research. This gap was supposed to be closed. The study was concerned with Europe as a whole but concentrated on the fifteen EU members in the year 2002.
We gave the report the heading "A Wake-up-Call for European Industry". So why should we wake up? Monsieur Busquin has already mentioned the Barcelona commitment to increase the investment in science and technology in the EU to 3% of the gross domestic product. That translates into hiring 500,000 new researchers to industry and academia and doubling the R&D investment by industry.
If we need to invest more in research and development, why should we focus on women particularly? The answer is simple: because they are there.
50% of the graduates from universities are women, in some countries even more. But somehow they get lost in the process.

It is clear that there is a smaller work force to draw upon in the future. The work force is ageing, that means we have to replace them by new young talents. We can't afford losing those women there. The costs to have one student finishing his or her studies are high. Not using this money for society is an awful waste. In addition, as women are gaining more increase in buying and decision-making power they should be involved in research teams, to define as well what the products of the future will be.

National differences

In the US 19% of workers in the industrial research are women. In Europe this amounts goes up to an average of 14.9%. Denmark and France are well off with over 19% of women researchers in industry, the present EU presidency Ireland has even 28% women involved in industrial research, and Portugal 24% - obviously there are a number of countries doing very well. The problem is Germany: one third of all European researchers in industry work in Germany but only 9.6% are women. This brings the average significantly down.
The situation in the associated countries is different: Lithuania and Bulgaria e.g., has a very high amount of women in industrial research.
There are major natural differences within Europe in how well women are integrated in the research processes in industry. Childcare is one critical point: childcare facilities often do not meet the needs of working mothers and fathers. I personally believe that this factor is one of the major reasons why Germany has such a low percentage of women in industrial research. Companies e.g., in France or Denmark, are doing much better in integrating their well-trained women and whole-day schools help to solve the issue of childcare.

Increasing diversity

So why increase diversity? We know that monocultures do not survive and, while downsizing, companies are also facing skill shortages. There will be a strong competition for highly qualified people. Hybrids are increasing in demand, i.e. people that have done more than one thing in their life, even including managing a family. To recruit this new breed of researchers and to build up multi-skilled teams means accepting candidates from less traditional roots - many are likely to be women.
New entrants to the workforce are clearly different from those of their parents' generation: dual career couples are not an exception, elder care will beco-

me almost as important an issue as childcare for men and women and reconstituted families are increasingly characterising our societies. Company policies based on the outmoded notion of a nuclear family - breadwinner husband and homemaker wife - will fail in the long run.
For the human resources departments of companies these changes in lifestyle require new thinking:

- Human resources departments of companies should take a hard look at the company to identify customs and practices that (however inadvertently) have the unintended consequence of structurally disadvantaging women or indeed excluding them from the organisation.
- The use of sex-disaggregated statistics and the development of equality indicators are important management tools.
- Gender impact assessments should be conducted as deliverables for new policies.
- Diversity measurements should be regarded as an investment: Consider the cost of not undertaking such measures: loss of talented, creative work force; inability to recruit the best "cloned" ideas in your research teams due to lack of diversity.

Based on this business need for diversity and gender balance, companies should first of all value and develop human talent and ensure that both men and women have a sensible work/life balance, i.e. flexible times for working. Gender balance in labs and in senior management should reflect roles in society. Organisations must embrace researchers with a whole variety of characteristics, not having one rule for everyone, and foster good practices to develop democratic, inclusive and innovative work cultures.

Women entrepreneurs

Looking at European entrepreneurs it shows the number of women owning businesses is growing but not as fast as in the US. Women entrepreneurs in Europe tend to have companies in the service sector, their businesses tend to be smaller and younger than those of men. And in spite of the fact - just for taking one area - that 28% of new Ph.D.'s in mathematics and computing in the EU are women, few have started an ICT business enterprise. The same is true for the biological sciences.
Women in enterprises tend to start with less capital. There is obviously less access to capital for women. One woman in our group who has very successfully founded a computer company, told us when she presented a bank her business plan they would just not believe that she could do it. She then decided to join up with a man and they got the money. This is a very good example for prejudices in banks - but also for women to think about strategies how to get the money anyway.
Maybe because of this financial problem, women in enterprises tend to grow at a slower rate then those owned by men. Data analysis from Denmark, however, show that companies owned by women have a better survival rate. Growth per se will not be the only indicator to measure success of a company. Being more careful in investments may also be a good way to sustain the business in the long run.

Conclusions

So what are our conclusions? First, there is a widely untapped potential of women in the EU, that industry is losing out. There are significant differences in the employment of women between countries but also between sectors and disciplines. Second, the urgent need to harmonise supporting structures across Europe to allow for better mobility for working parents. Countries where childcare facilities are not in place or where the companies do not care about it, will do worse in attracting foreign talents. The harmonisation should also be an issue for national governments to increase the mobility of researchers.
Third, a concerted action between the EU, national governments and companies and, of course, last but not least the women themselves to better understands the road-blocks. We need further research into the different national European governmental and company policies to see the differences and to learn how to successfully recruit women and keep them in the process. I call for the European Parliament, the Commission and national governments to follow this path. Monsieur Busquin has been a role model in saying 'I want to see 40% women on every committee that I have'.

Analysis of statistical data and good practices of companies: presentation of the WIR study

Prof. Dr.
Danièle Meulders
Free University Brussels

The WIR study constitutes the result of a comprehensive research project of the Belgian EU-Presidency, funded by the European Commission, DG Research.

The main findings of this analysis were presented by the project manager, Prof. Danièle Meulders from the Free University of Brussels[1].

The "Analysis of Statistical Data and Good Practices of Companies" is divided into two main parts: qualitative and quantitative analysis. The quantitative part offers a critical inventory of existing harmonised data sources to analyse the situation of women in industrial research. The main data sources were the European R&D Survey, the Community Labour Force Survey, and the European Structure of Earnings Survey. Danièle Meulders stated that there was a urgent need to improve statistical sources and to build gender indicators for benchmarking women's presence in industrial research.
As main results of the qualitative analysis Ms Meulders mentioned the under-representation of women and the sectoral, occupational, and educational gender segregation. Women researchers tend to be a very young labour force and to have few dependent children. The employment quality is low: temporary contracts, shorter job duration, small firms and a significant gender pay gap: 80% in Belgium versus 78% in the USA.
The leaky pipeline process starting from the lowest level of education up to the highest levels of employment women continuously drop out. At each career stage the proportion of women decreases. This phenomenon is observed in the public sector as well but women's under-representation in the private sector is stronger. In Germany women occupy 5.1% of the key positions in research institutions, and in France only 3% of the female engineers perform jobs involving high levels of responsibility (compared to 15% of their male counterparts).
The conciliation of professional and family life still remains to be mainly of concern to women. Men's implication in family affairs progresses very slowly. In the EU women spend twice as much time with their children than men and they spend three times as much time on household chores.

Qualitative analysis

The qualitative analysis questioned the apparent neutrality of business: Is neutrality gender neutral? Or does is perpetuate men's relative advantages? Danièle Meulders described the gender blindness of industry and the denial of discrimination by women. Especially young women claim not to have experienced any discrimination.

Neutrality versus good practices

The identification of good practices in research companies in Europe showed how 'neutrality' hinders the promotion of women in industrial research. Most firms claim to be neutral in their human resource practices. They justify this attitude stating that women and men have no wish to be treated differently. In addition, human resources managers are not aware of the risks of indirect discrimination and are in conflict with the notion of mainstreaming: they ignore the specific employment characteristics of women.
Danièle Meulders reasoned that neutrality hinders the implementation of good practices and pointed out the need to convince men since they hold the key positions in industry and political life and also as the sharing of household tasks needs to become more equal. Recommendations so far are usually being addressed to women: women need to adjust their behaviour in order to avoid being discriminated against, display strength of character, be aware of their market value, keep their sense of humour, be self confident, take criticism in a good spirit... But men need to be convinced more urgently.
The study was carried out by an research consortium from the Free University of Brussels and CIREM, Foundation Centre for European Initiatives and Research in the Mediterranean.

Part 2 - Priority Areas to act: Reports of the Parallel Workshops

Workshop 1

Young Scientists - How to motivate more young women to pursue careers in industrial research?

What can companies, schools, universities do?
By Barbara Schwarze.

Presentation of Barbara Schwarze

Future opportunities for young women scientists in industry depend to a considerable degree on the attitude of European society towards women in scientific or technical careers. Parents, friends, teachers, career officers, lecturers, professors and employers play an important role for girls and young women planning their careers. Scientific professions and careers in research should therefore be presented as attractive perspectives for young women. Diverse company cultures that allow and accept differences in gender, cultures, age and religion and make them a deliberate part of their personnel planning and strategies are seen in a favourable light by society. Companies give a signal to the general public, if their Human Resources Strategy incorporates diversity and gender awareness as a longer term goal.
Workshop 1 not only focused on the young scientists themselves, but also presented good-practice examples for initiatives at schools, universities, international summer universities, in companies and in research. Students, young scientists and their professors had a lively dialogue on their visions for a future for women and men in science and technology.
Nowadays, it is internationally accepted that a consistent bundling of initiatives for girls and women in schools, universities, research, associations and companies can facilitate a real change in young women's access to scientific careers. Reports like the "Tech Savvy Report"[1] in the USA, the "Greenfield Report"[2] in Great Britain or the German "Future Opportunities Conference"[3], and the report of the Bund-Länder Kommission on women in natural sciences and engineering and on women in science[4] drew together recent results from socialisation research, women's studies, industry and technology research and university didactics.
As Barbara Schwarze, managing director of the Centre of Excellence Women in Information Society and Technology, pointed out in her keynote speech, innovative projects for girls, such as the national "Girl`s Day" in Germany, make changes happen. In 2003, more than 101,000 girls took part in nearly 4,000 companies, universities, city halls and research centres. Nationwide, 173 regional coordinating groups, consisting of regional members of trade unions, women and profession projects, employers` organisations and chambers of trade and industry, looked for companies and schools to take part in this event, helping girls and parents to find institutions to visit. Other European countries, like Luxembourg, the Netherlands, Switzerland and some regions in Austria, are also planning or have already launched a Girl`s Day.
The "Tech Savvy Commission" stated in 2000[5] that computer culture would do well to catch up with the girls since they are pointing out important deficits in the technology and the culture in which it is embedded. They proposed that the female point of view should be integrated into our general thinking about computers and education. The Commission believed that girls' legitimate concerns should focus our attention on changing the software, the way computer science is taught, and the goals for which we are using computer technology.

[1] Commission on Technology, Gender, and Teaching Education of the AAUW American Association of University Women, Educational Foundation (2000): Tech Savvy. Educating Girls in the New Computer Age, www.aauw.org

[2] The Baroness Greenfield CBE to the Secretary of State for Trade and Industry (2002): SET FAIR. www.set4women.gov.uk/set4women/research/greenfield-report.pdf

[3] Women give New Impetus to Technology, Inc. (2002): Future Opportunities generated by Diversity in Higher Education and Training - Gender Mainstreaming as an Impetus and Driving Force behind the Course Reform in Computer Science, Engineering and Natural Sciences. Conference on 1-2 February in the Deutsche Museum in Munich, www.impulse-nutzen.de.

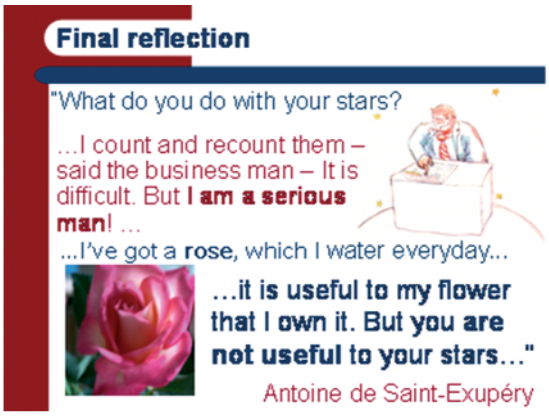
[4] Bund-Länder Kommission (2002): Women in engineering and natural sciences (Heft 100); Women in Science (Heft 87 (2000). Bonn 2002

[5] Commission on Technology, Gender, and Teaching Education of the AAUW (2000): Executive Summary. http://www.aauw.org/research/techexecsumm.cfm

As a very ambitious and successful project for schools, youth centres and universities, Ulrike Petersen from the Fraunhofer Institute for Autonomous Intelligent Systems, presented "Roberta - Girls Discover Robots". Using the field of edutainment robotics with a gender approach, they teach multipliers, like e.g., teachers, university lecturers and technical museum staff, to simulate natural phenomena with robots. Girls learn to design and construct robots, to write programs and to combine these activities within a system development process. The programme already showed very good results for the self-confidence of girls thinking of a possible future as computer experts.

Presentation of Ulrike Petersen, Fraunhofer Gesellschaft

Prof. Dr.-Ing. Peter Pirsch from the Architecture and Systems Group at Hanover University focused on the necessity of a holistic approach for technical programmes trying to promote female students from the beginning of their studies at university until the planning of a career in the field of science and technology. He emphasized the importance of collaboration together with industry at all university levels where universities are asked to offer career courses for women students, to bring them into contact with mentors from industry and research while industry offers human resources for the mentoring projects and opportunities for gaining practical experience at all levels.
New ways of supporting female engineering students and female engineers by building up an international network and joining a summer programme were presented by Gay Tischbirek, Director International Service and IIWE Coordinator[6] at the EPF Ecole d'Ingénieur, and Müge Eczacioglu, young female engineer and HR specialist from Turkey. Engineering cultures worldwide, career management issues, women in engineering, ethics, intercultural communication, industrial visits and panel discussions are some of the topics of the programme. Blanka Kocikova, engineer from Slovakia, who has taken part in the Women Summer University (WSU), which is strongly linked to IIWE, reported on how students and engineers benefit from taking part in these international programmes: higher self-confidence, chances to meet and interview successful role models, employers, industry and research representatives and, of course, being part of a global network.
Outdated ways of thinking and prejudices that young female engineering students and staff are faced with, and the new ways of thinking in a diverse world of women and men working together were the topics of an interesting discussion between Prof. Christine Heller and her female engineering student Cristina Bonilla, from the Universidad Pontificia Comillas, Madrid. They illustrated the difficulties, stressed the need for a more intense dialogue for both women and men in engineering, and clearly demanded to "humanize" engineering by strengthening social conscience and the respect for human emotions and necessities. Heller and Bonilla both asked for a more diverse culture in the field of engineering by integrating the interests of women for more social benefits and sustainability in technology and for more attractive environments in engineering education.



Presentation of Prof. Christine Heller and Cristina Bonilla

Sylvia Stange from the Central Office for Human Resources Strategy at the Deutsche Telekom pointed out the interest of big companies in a diverse workforce in the sector of information and communication technologies (ICT). Since the Deutsche Telekom Group has 265,000 employees worldwide, among them 88,000 women, its HR diversity strategy targets all job levels. They are furthermore initiating and supporting European and national projects for women in ICT.

[6] www.iiwe.epf.fr

Prof. Antonietta Albanese and Dr. Andrea Valsecchi from the Università Degli Studi Di Milano, turned the focus to the field of science and research, where several projects showed the importance of having women and men in the research groups. Prof. Albanese and Dr. Valsecchi exemplified this topic by a project on street safety, where young women researchers played a crucial role for the success of the project, proving that their interests and skills were needed in research.
The topic of diversity as a global business imperative was last but not least stressed by Dr. Peter Ramm, Siemens AG, who focused on the benefits of a diverse workforce for a global player. Increasing the number of female graduates in technology is a goal for Siemens, especially in Germany, where the company has a long term recruiting strategy to this end. Starting with technology adventure camps for girls from the age of 15, the company promotes a programme called "Yolante" (Young Ladies´-Network of Technology) which serves to coach and support 100 young women per year throughout their studies in engineering and science.
Before going into business, female students at four technical universities are supported by the so-called "Femtec" programme, helping them obtain additional qualifications in business administration, management and leadership.

Presentation of Dr. Peter Ramm, Siemens AG

Main Results

As a conclusion of Workshop 1, Gill Gordon, Director of Personnel North & Central Europe, Schlumberger Ltd., pointed out the following results:
The working group reviewed many practical examples of how to motivate more young women to pursue careers in industrial research. It was obvious that action has to be taken at many different levels - national, international, schools, universities, industry, EU & personal level. Above all, the working group "Young Scientists" stated that it is **most important to implement practical measures and above all to act now**.

1. Schools - both primary and secondary

- The broad approach of the German "Girl´s Day" has been very successful. Suggestion - extend the programme to all European countries or even on globally.
- Involve parents - educate them about the interesting careers in Science & Technology.
- Encourage high schools to start projects in cooperation with industry, such as the Robots & Girls Project. This has encouraged girls to believe they can become computer experts. Orientate sciences education towards 'learning by doing' and with more focus on the application of S&T. Make it more interesting.
- Set up mentoring projects for girls in cooperation with companies.
- Train and sensitize teachers to the issue.

2. Universities

- As can be seen at Hannover, universities should set targets and monitor progress. Likewise, there should be targets for female professors. Hannover has set a target of 25% by the year 2005 and is close to achieving it.
- Monitor the drop-out rate and its reasons for it. Recognize isolation and exclusion experienced by a small number of women students. Implement initiatives such as that of a US university which has grouped female engineering students in the same residence.
- Start mentoring programmes for high school students and female PhD students. Prepare female students for work in different cultural surroundings by supporting summer projects of the IIWE and the WSU. Initiate more activities at companies, such as those at Siemens and Deutsche Telekom.

- 'Humanize' engineering teaching. Develop non-technical skills. Make students more aware of the benefits of science and technology to society.

3. Industry

- Companies must build and communicate a business case for gender diversity.
- It is essential to provide more flexibility in the workplace and to take an active role in managing dual careers. In Germany, more creative ways of handling the 3-year parental leave could be introduced to keep women in touch with the company or to allow parents to share the parental leave.
- Companies need to develop links with schools as Siemens & DT are now doing.
- Companies must track progress in diversity as well as monitor attrition and its reasons.

4. Governments & EU

- Support students and staff who wish to take part in national and international initiatives such as the IIWE (International Institute for Women in Engineering) in Paris, which is supported by both university and public funding. Help female S&T students and graduates all over the world to get fit for the international employment market.

5. Individuals

- Publicise more interesting personal stories from female students and engineers, who have gained valuable international work experience.
- Encourage young women to be curious and adventurous in pursuing career opportunities.

Chair:
Dr. Michael Sanderson,
CEO, SEMTA (Sector Skills Council for Science, Engineering and Manufacturing Technologies), United Kingdom

Rapporteur:
Gill Gordon,
Director of Personel North & Central Europe, Schlumberger Ltd.

Keynote speaker:
Barbara Schwarze,
Managing Director, Centre of Excellence Women in Information Society and Technology, Germany

Panellists:
Ulrike Petersen,
Fraunhofer Institute for Autonomous Intelligent Systems (AIS)
Prof. Dr.-Ing. Peter Pirsch,
Architecture and Systems Group, University of Hannover
Gay Tischbirek,
International Service Ecole d´Ingenieur, International Institute of Women in Engineering
Müge Eczacioglu,
Engineer, Turkey
Blanka Kocikova,
Engineer, Slovakia
Dr. Christine Heller del Riego,
Escuela Técnica Superior de Ingenieria, Universidad Pontificia Comillas, Madrid
Cristina Bonilla,
Escuela Técnica Superior de Ingenieria, Universidad Pontificia Comillas, Madrid,
Sylvia Stange,
Central Office for Human Resources Strategy, Deutsche Telekom
Prof. Antonietta Albanese,
Dr. Andrea Valsecchi,
Università Degli Studi Di Milano
Dr. Peter Ramm,
Policies and Legal Issues for Global Personel, Siemens AG

Workshop Coordinator:
Barbara Schwarze
Competence Center Women in Information Society and Technology

Workshop 2

Careers for Women in Industrial Research and Good Practices of Companies

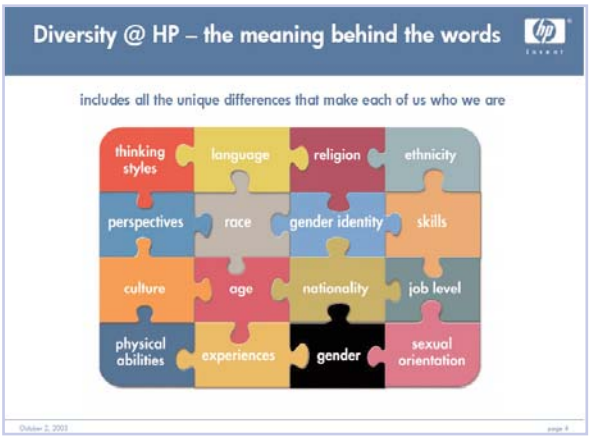
What can companies do to promote women, to change the culture of research, the framework conditions and to have more women on the top level?
By Isabel Beuter.

Workshop 2 was aimed at companies and questioned possible strategies to be undertaken in order to promote women's careers, to change the culture of research and the overall framework conditions. While workshop 5 aimed at those women who have already achieved success, workshop 2 asked how to get them there in larger numbers.
The discussion in workshop 2 included work-life balance, diversity and examples of what companies can do to promote women in industrial research.

In her keynote speech, Dr. Brigitte Mühlenbruch from the Center of Excellence Women and Science CEWS, based in Bonn, Germany, pointed out that we have to be clear who we talk about and what we mean by the term "career". This includes the fact that especially in research positions scientists do not always wish to leave their discipline for a management position and that the first step has to be to help them pursue a career in research in the sense of continuous and appreciated research work. This has to be recognized by companies and there are examples like, e.g., AstraZeneca, who have tackled this issue. The company has launched "Science Ladder", a program that recognizes the desire to stay in research and not "be sent" into management for career advancement. Human resources tools can include tailored packages (more benefits, vacation time, cash) that reward quality and depth in scientific thinking to stimulate a long-term career interest in science and therefore offer an alternative to moving into management.
When defining careers, work-life balance, flexible working hours and part-time work have to be part of the discussion. The decisive question is the influence alternative working patterns and taking time out, e.g. to raise a family, have on career development. Last but not least, Dr. Mühlenbruch pointed out the importance of women for European research in general and for application-oriented research in particular.

Presentation of Dr. Brigitte Mühlenbruch, CEWS, Germany

The importance of having diverse research teams, including not only women but more women, that was highlighted in the WIR Report was at the centre of the second keynote by Susan Bowick, Vice President of Hewlett Packard, USA.
She showed how companies have started to consider the gender issue in a broader context under the term "diversity". Especially for R&D companies, diversity is a vital aspect since diverse workforces bring creativity into research. Or, to put it differently: Cloned minds produce cloned ideas. On the other side of the business line, customers are a very diverse group and have to be addressed differently. They will ask for or actually need different products, as we have learned, e.g., from medical science.



Presentation of Susan Bowick, Hewlett Packard

Bowick made it clear that for HP the commitment to diversity is part of a process of striving to be the best place to work and the best place to conduct

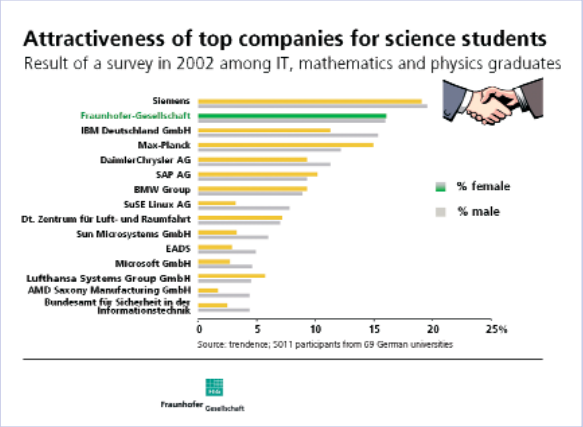
business throughout the world. This was underlined by the fact that HP was also present in workshop 5 and, most importantly, signed the CEO position paper presented at the WIR Conference.
Hans W. Jablonski and Gabriela Hahn from Ford, Germany, gave another example of an R&D company that has taken on a committed diversity management. One aspect of this are the Ford Employee Resource Groups, including several Women's Groups, i.e. the Women's Marketing Panel (WMP), IT Women in Leadership (IT WIL), Women in Human Resources (WiHR) and the Women's Engineering Panel (WEP).

Activities of the Womens Engineering Panel include:

- Development and analyses management surveys to assess awareness of work-life balance initiatives
- Initiation Women@Ford, a workshop for female employees currently involved in Resource Groups
- Creation of a link to VDI (German Engineering Society)
- Participation in the exhibition Women in Science
- Presentations on the topic of "How can parents influence the vocational choice of their daughters?" during WorkLife-Week 2002

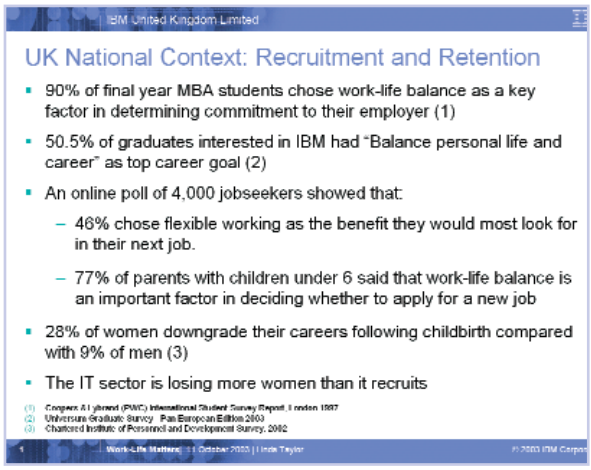
Dr. Dirk-Meints Polter from Fraunhofer, Germany's leading contract research organisation, stressed that scientists working for the Fraunhofer Gesellschaft profit from the organization's high reputation, which allows them to establish useful contacts during their project work, and may later enable them to acquire attractive positions elsewhere: in business or industry, in science or politics. With his statement he underlined the need to see careers as more than "simply" reaching top management positions.
Measures to make Fraunhofer attractive especially for women scientists include:

- Mentoring, cross-mentoring (by external mentors with close ties to industry and science) and coaching schemes
- Family-oriented measures to improve the "work-life balance", including the establishment of childcare facilities and support for fathers on paternity leave
- Research projects devoted to women's issues
- Application of the principles of gender main streaming
- Respect for the needs of dual-career couples



Presentation of Dirk-Meints Polter, Fraunhofer Gesellschaft

In her presentation, Dr. Venceslava Tokarova from the Czech-based Research Institute of Inorganic Chemistry, put her finger on some of the difficulties women from CEE (Central and Eastern European) countries had to face after the breakdown of the communist regimes. She also pointed out some difficulties women seem to be confronted with more often than men. These included questions of how to combine motherhood and career, how to create and lead a research team, how to build up self-respect and self-esteem, and finally: How can women turn their problems into advantages?
The focus of the workshop thus shifted more and more towards work-life balance.
Dr. Linda Taylor, IBM U.K., presented some findings for the U.K. that pointed out the importance of addressing issues of work-life balance from a company's point of view: **(see graphic on the next side!)**
As a reaction to these findings, IBM U.K., has established policies and practices that help and encourage women during the family phase of their life to keep in touch with the company and return to work. Women returning from maternity leave receive additional payments to assist with childcare and can adopt a number of flexible working arrangements. Women working part-time can continue to hold significant technical positions and advance their careers throughout their childbearing and childrearing years if they wish to do so.



Presentation of Linda Taylor, IBM

In the final presentation of the workshop, Amy Simpson from Schlumberger, France, gave insight into some management activities that help her company to keep women in the company.
Lessons to be learned from Schlumberger to reach effective retention of women engineers and scientists include:

- Opening up career paths - cross-function/cross-business development
- Promotion at an appropriate pace - individual career management
- Communication - Mentoring women to push their career expectations
- Family considerations - maternity leave policies & communication, paternity leave
- Dual careers - within the company and outside. This led to setting up Partnerjob.com together with several other companies in France.

Although it became clear that many activities are often aimed specifically at women, the participants agreed that work-life balance concerns women and men, even if they have no children, and is a central aspect of any career development. Flexible working hours and part-time work help to balance private and work life but what it really takes is the acceptance of moving up on the career ladder in spite of part-time work and/or a break in your working life. This means that employers and employees have to accept that productivity is all too often linked with the amount of time spent in the office or lab. Companies that support employees who wish to put their private life first for a period of time will gain very committed employees in return.

The overall message of the workshop was:
When talking about diversity it is important not to deny differences and biases but to accept them. After all, this is not the real problem - provided you check your decisions for possible biases and are willing to adjust your decisions accordingly.
Companies have to send a message from the top of the organisation signalling that there is a new business agenda which includes the internal commitment to diversity. The next step will then be to make this commitment visible externally, e.g., through applying for certificates and awards. Examples of this are the Total E-Quality Award in Germany or the European initiative 100 Best Workplaces.
Looking at best practices, we can see that strategies to recruit, promote and retain women are diverse; it is not likely that there will be the one single solution. But by coming together and discussing possible solutions we might learn from each other and thereby push the issue further into the minds of companies, women, men and decision-making bodies.
One decisive point in the future will be to create alternative career patterns that are accepted within the companies in the sense that work breaks no longer equal career breaks or even the end of a career. This also includes accepting the fact that not all scientists wish to go into top management positions and therefore need different forms of benefits, fixed terms, project positions and job rotation schemes.
Recommendations of the workshop included:

- Establish a Diversity Champions Network of the Diversity and HR Managers of R&D companies at European level to promote and monitor change.
- Alternative career patterns should be supported: fixed terms should be assigned to management roles, job rotation would allow researchers to go back into research after a period of management tasks. Career breaks should be accepted and encouraged not only for childcare but also, e.g., for further training. This would also affect the levels of acceptance of the culture of flexible working hours and part-time work so that they are no longer hindering a career.
- All aspects of work-life-balance and dual careers have to be promoted. To this effect, successful initiatives like Partnerjob.com should be expanded on international and intersectoral levels and extended to public research organisations and academia.

- To promote change and increase transparency and visibility of successful strategies, a European award "Best place to work for women in R&D" should be developed and implemented. Experiences from existing awards, like the Total E-Quality Award in Germany or the European initiative 100 Best Workplaces, can provide useful orientation.

Chair:
Dr. Ragnhild Sohlberg,
Vice-President, Corporate Centre, Norsk Hydro ASA, Norway

Rapporteur:
Dr. Jenny Holmes,
R&D Diversity Director, AstraZeneca, United Kingdom

Keynote Speakers:
Dr. Brigitte Mühlenbruch,
Center of Excellence Women and Science - CEWS, Germany
Susan Bowick,
Executive Vice President of Human Ressources and Workforce Development, Hewlett-Packard Company, USA

Panellists:
Gabriela Hahn/Hans W. Jablonski,
Ford Werke AG, Germany
Dr. Dirk-Meints Polter,
Fraunhofer Gesellschaft, Germany
Amy Simpson,
Schlumberger Ltd., France
Dr. Linda Taylor,
IBM, United Kingdom
Dr. Venceslava Tokarova,
Research Institute of Inorganic Chemistry, Czech Republic

Workshop Coordinator:
Isabel Beuter,
Center of Excellence Women and Science - CEWS, Germany

Workshop 3

Enhancing the participation of women in innovation and entrepreneurship

What can be done to increase the number and participation of women in the innovation process?
By Friederike Welter.

What can be done to increase the number and participation of women in the innovation process, with particular attention on fostering women entrepreneurship? This topic was discussed in workshop 3, based on contributions from seven speakers who focused on different aspects of women entrepreneurship and women in innovative sectors. Presentations and discussion concentrated on good support practices for women entrepreneurs and women inventors, strengths and weaknesses as well as gaps between different policy approaches, and the question whether there are specific gender-related problems for women in order to realise inventions, innovations and/or to enter innovative entrepreneurship.

Francoise Soussaline, founder, President and CEO of IMSTAR, a small high-tech company for life sciences research and medical diagnostics, introduced and moderated the workshop, outlining the main topics and questions to be discussed, whilst *Carmen Vela Olmo*, managing director of INGENASA, a small biotechnology company based in Madrid, acted as rapporteur and presented the results of workshop 3 in the afternoon plenary session.

Keynotes were given by Prof. Sara Carter, University of Strathclyde, and Gertrud Bohlin, currently District Manager of the Confederation of Swedish Enterprise. Sara Carter concentrated on facts and data about women as entrepreneurs, their characteristics and businesses, and their experiences as business owners in the EU, as compared to the USA. Despite an upsurge in women entrepreneurship, there are still considerably less women entrepreneurs, most of them to be found in traditional sectors.
She continued discussing barriers faced by women in starting and growing a successful business as well as the problems faced by women entrepreneurs in innovative sectors. Although women entrepreneurs in these sectors are usually better educated, this does not totally compensate for disadvantages innovative women entrepreneurs experience. A major problem is that they lack the support and 'role model' effect of other women and need to develop business 'credibility' on their own. Moreover, whilst women prefer to work on their own, innovative sectors and products require a team approach.
Carter's presentation concluded stating that although there are fewer women in innovative sectors, this is less related to personal characteristics and abilities. New research for the UK shows this to be more a result of structural and experiential factors, as women lack opportunities to lead spin-outs, they do lack sufficient networks (which need to be wide and possess weakties) and do lack business credibility.

Women Entrepreneueurs in EU

- Number of women choosing enterprise and starting businesses has increased over past 25 years
- Women still a minority of business owners, 25%-35% across the EU
- Many Women involved in 'co-ownership' of family firms or firms with mixed gender ownership
- Concentration in traditionally female sec tors of the economy

Presentation by Carter, 2003

Presentation of Sara Carter, University of Strathclyde

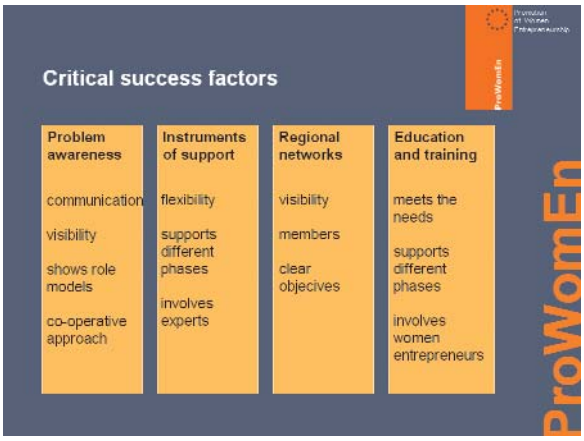
Gertrud Bohlin discussed policy approaches for supporting women entrepreneurs, using IDEON, the first science and technology park in Sweden as one example, as well as the support measures of NUTEK, the Swedish Business Development Agency. Beginning her presentation, she outlined the major arguments why support for women entrepreneurs is important, stressing issues such as equal opportunities, as well as the contribution of women entrepreneurs to industrial and regional development.

Examples of Swedish support policies for women entrepreneurs refer to increasing the visibility of women entrepreneurs through statistics, seminars, and role models. NUTEK as a support agency also develops knowledge on women entrepreneurs both through research and by publishing handbooks. Moreover, NUTEK has introduced women business advisors.

Presentation of Gertrud Bohlin, Confederation of Swedish Enterprise

Bohlin concluded that enhancing the participation of women in innovation and entrepreneurship is less a matter of skills, but more a matter of attitudes, support and traditions.
Presentations from Elena Nielsen-Garcia (EU, DG Enterprise), Eva Heckl (KMU-Research Austria) and Christina Diegelmann (Ministry of Economic Affairs of the State of Baden-Württemberg) focused on the question of how to best mobilise women entrepreneurs.
Elena Nielsen-Garcia gave an overview of the actions supported by the European Commission to promote female entrepreneurship. This includes initiatives such as BEST, WES, EQUAL. Whilst BEST deals with how best to improve the environment for women entrepreneurs as well as promoting good public policy practices (cf. Heckl's presentation below), WES refers to a network of 16 representatives from the EU including Norway and Iceland, which was created in June 2000 with support from the European Commission. WES participants are both representatives from national governments as well as institutions, which are in charge of promoting women entrepreneurship. WES aims at increasing the visibility of women entrepreneurs and creating a favourable climate for women entrepreneurship in order to increase both the number of new women-led businesses and the size of existing ones. To reach these objectives, WES actively seeks dialogue with European institutions and professional organisations.
In addition, Nielsen-Garcia presented the Green Paper on Entrepreneurship in Europe, through which the EU sought the views of all those involved in fostering, teaching, researching or undertaking entrepreneurship themselves on how to increase the number of entrepreneurs and how to interest entrepreneurs in expanding their businesses. Using the feedback from the electronic consultation process, the EU will now set up an action plan.
Another important element of the EU's policy approach refers to the EQUAL initiative, which is financed through the European Social Fund. One of the nine thematic areas deals with entrepreneurship, aiming at opening up the business creation to all and at strengthening the social economy.
Eva Heckl presented details of a particular EU research study within the BEST programme, aimed at identifying public good practices in fostering women entrepreneurs in Europe, such as start-ups, information/advice, funding, training, mentoring. These measures were evaluated and fifteen cases of good practices were identified in the EU and EFTA/EEA countries. Relevant good practices implemented in other OECD countries were also registered. Furthermore, a comprehensive set of methodological criteria permitting the assessment of the performance of a particular measure over time was developed and presented in an Evaluation Handbook. Criteria for the identification of measures include provider-based criteria, such as those adopted by a national administration, user-based criteria, which have (potential) women entrepreneurs as their direct target group, and content-based ones, i.e., for selection the measures had to fall into one of the following categories: institution, support service, electronic platform, guide, or regular event.
The study deliverables include a publication on "Good Practices in the Promotion of Female Entrepreneurship", the database "Female Entrepreneurship", and the guide "Evaluating Actions and Measures Promoting Female Entrepreneurship". The deliverables of this project can contribute to raising awareness amongst public administrations, professional organisations, entrepreneurs (or would-be entrepreneurs) and the private sector on the support needs of women entrepreneurs and the existing measures and good practices.
Christina Diegelmann introduced the ProWomEN regional network approach. ProWomEn - Promotion of Women Entrepreneurship is a thematic network involving 16 European regions which aims to allow a comparison of different approaches and an exchange of good practice. The network advances the state of the art of regions to support women in order to develop their potential in creating innova-

tive ideas and starting their own businesses. The ProWomEn project focuses on networking regions which have already implemented structures to promote women entrepreneurship as well as regions that do not have much experience, but recognise a need to foster women entrepreneurs.
The ProWomen network identified a number of critical success factors related to different phases of network development and support policies, which could assist other regions in installing adequate support policies.
Moreover, Diegelmann presented two good-practice examples, drawing on examples from Germany. She referred to the "TWIN" project in North-Rhine Westphalia, where a woman entrepreneur with more than 5 years of experience acts as mentor to a woman entrepreneur just starting her enterprise (www.u-netz.de/twin). The underlying philosophy is one of encouraging women entrepreneurs to join networks and make use of their facilities. The second example is PriManager in Baden-Württemberg. School teams in secondary schools play virtual business games, simulating venture creation and development (www.primanager.de).
The second round of presentations focused on the topic of how to foster innovative women entrepreneurship and how to bridge the gap between innovation policies and entrepreneurship support.
As a starting point, Maila Hakala, president of QUIN, the Finnish Inventors Organisation, concentrated on possibilities to influence the participation of women in innovations, in particular discussing women inventors' networks and similar projects. Male inventors say "It is me who invented this", but women say "I am not an inventor - I just got a good idea". In Hakala's view, this statement refers to one of the



Presentation of Christina Diegelmann, Ministry of Economic Affairs, Baden- Württemberg

major problems preventing women from making full use of their inventions and commercialising those successfully. In this context, associations such as QUIN could assist in promoting successful role models as well as lobbying for women inventors. Moreover, some countries such as Finland, Sweden, Canada, and the UK have introduced specific projects to foster women inventors. Examples of support measures include videos, books, exhibitions as well as seminars and women advisors, idea competitions for women (www.tuulia.net) or female inventor awards.
Hakala concluded her presentation by questioning the approach of the European Union to (not) foster women inventors. She specifically referred to the "EU Green Book on innovations", published in 1996, which did not mention women when listing measures for enhancing innovation activities in Europe. She argues that women ought to be taken more seriously into consideration as potential inventors and innovators. This would include asking them about their experiences and possible barriers in commercialising inventions, whilst the EU could encourage all its member countries to launch national projects for women inventors.
Finally, Friederike Welter (Rhine-Westphalia Institute for Economic Research) gave an overview about policies to support women entrepreneurship, innovative entrepreneurship and innovations. Welter showed the main trends in supporting women entrepreneurs in Germany, which include, e.g., micro-credit programmes, but also a recent focus on networking and mentoring. She then sketched the existing policy measures in Germany to (re-)orientate young women towards science-related studies (cf. also workshop 1) and towards 'extending' occupations and advancing careers of women in science and research, through, e.g., coaching and mentoring women scientists in research institutes.
In analysing the strengths and weaknesses of the different policies, she drew attention to the missing links between these different policy approaches. Policies and support for women entrepreneurs is mainly focused on financial or human capital needs, whilst the overall legal and institutional framework is neglected. Moreover, there is no explicit link between support for women entrepreneurship and those support measures fostering innovative/graduate entrepreneurship. With regard to policies geared at supporting innovation and women in science, her analysis showed that these support measures neglect women entrepreneurship as a professional choice. Moreover, invention and innovation

policies do not explicitly consider (women) spin-offs nor the different 'invention behaviour' of women. Welter concluded her presentation by asking whether we need specific approaches to support women in/into innovative entrepreneurship and how existing policies can be integrated better.
In a lively round-table discussion, the workshop speakers and participants argued the issues presented, finally agreeing on several conclusions. They foremost see a need to widen the debate on women in industrial research by innovation, entrepreneurship and ICT as well as to start early, with information and training of girls and female students on women entrepreneurship. Management skills should be part of the curricula in science and engineering courses. Moreover, there is a need to promote realistic role models, specifically success stories of innovative/ high-tech women entrepreneurs and foster mentoring for women entrepreneurs.
(Access to) Finance is a critical issue particularly for growth-oriented women entrepreneurs and women entrepreneurs in innovative and high-growth sectors. Here governments should pay attention to matching private funds with public money.

Workshop 3 ended with speakers and participants jointly suggesting the following specific actions:

- There should be an annual conference with a special focus on women and intellectual property. This could be organised in co-operation with the European Patent Office.
- The European Union should provide statistical data and analyses on women entrepreneurs in innovative and high-tech sectors.
- There is an urgent need to create a European office of women's business ownership with regional/national offices, which coordinates, assembles and distributes information on national activities, programmes, role models, develops a marketing strategy to promote the visibility of (innovative) women entrepreneurs, and commissions research where necessary.

Chair:
Dr. Francoise Soussaline,
President and Founder, IMSTAR S.A., France

Rapporteur:
Carmen Vela,
Managing Director, Ingenasa, Spain

Keynote Speakers:
Prof. Sara Carter,
University of Strathclyde, United Kingdom
Gertrud Elisabet Bohlin,
Confederation of Swedish Enterprise, Sweden

Panellists:
Elena Nielsen-Garcia,
EU, DG Enterprise
Eva Heckl,
KMU-FORSCHUNG AUSTRIA, Austria
Christina Diegelmann,
Ministry of Economics, Baden-Württemberg, Germany
Maila Hakala, QUIN, Finland
Dr. Friederike Welter,
RWI Essen & JIBS Jönköping, Germany

Workshop Coordinator:
Dr. Friederike Welter,
RWI Essen & JIBS Jönköping, Germany

Workshop 4

Improving the knowledge base on women in industrial research - What are the facts and figures?

What needs to be done to have more gender-differentiated comparable data on company level, sectors, countries? How can qualitative research be improved?
By Christa Revermann.

The workshop was focused on gender-differentiated data on R&D-personnel, in particular scientists and engineers in enterprises. Starting from the status quo of available comparable figures from different countries, precise ideas should be developed on how to enhance the information basis and to improve qualitative research.

Keynote

The keynote speaker, Maria Caprile, is co-author of the study "Women in Industrial Research - Analysis of Statistical Data and Good Practices of Companies". The main data sources analyzed in this study are the European R&D Survey and the Community Labour Force Survey (CLFS). The R&D Surveys are at least partly harmonized in Europe. As for the business enterprise sector, the reporting units are mostly companies. In most European countries, some questions concerning female R&D personnel are included in the questionnaires. But often these questions are rather new and data access and data quality in this area has up to now not always been good. Moreover, only few countries have compiled data on the level of qualification or field of science of R&D personnel. On the other hand, the CLFS is a household survey and provides considerable gender-differentiated data, e.g., the qualification as scientist or researcher. From this source it is not possible, however, to deduce whether the individuals are actually working as industrial researchers. In this case, it is therefore necessary to define an auxiliary target group to reach an approximation for industrial scientists and engineers.
In spite of these restrictions, Maria Caprile presented some interesting results. It became obvious that women's participation in industrial research is rather low in many European countries whereas all countries possess a large potential of highly qualified women, which is still unused. The differences between the countries are remarkable: In 1999, the female proportion among industrial researchers varied from 28% in Ireland to 9% in Germany.
These proportions strongly correlate with the share of women among all graduates in natural science and engineering.
Some useful gender-sensitive indicators have also been developed, such as the "gender employment gap by family situation", which shows the impact of parenthood on employment opportunities for highly qualified women.
The keynote speaker summed up that in spite of recent progress, statistical sources are far from sufficient. Since reliable data is necessary as a basis for political and economical decisions, she suggested:

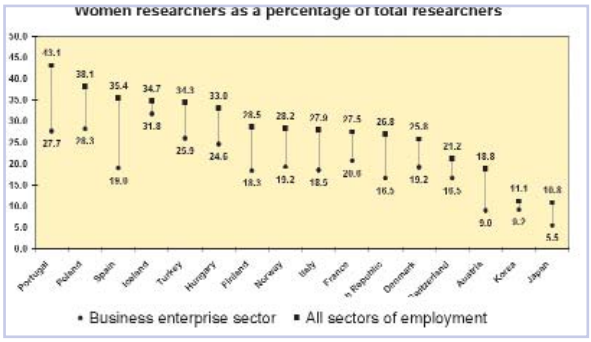
- For the R&D surveys, greater efforts should be made at European level in order to improve the harmonisation and to obtain more information on the level of qualification or the field of science.
- The Community Labour Force Survey should include new variables, such as research activity and field of study.
- The European Structure of Earnings Survey should allow for a more disaggregated break down by education and occupation.
- A specific survey among scientist and engineers could provide richer information on highly qualified women and men than the currently available sources.
- More gender-sensitive indicators should be developed from available statistical sources.

The reliability of available R&D data was an issue in the discussion. August Götzfried from Eurostat informed about the intended legislation on R&D statistics. In this context, an output harmonisation is planned with respect to included variables, breakdowns, definitions and data quality. This will hopefully improve comparability as well as reliability. Concerning new specific surveys, it was referred to some specific data collections available, such as those on PhD-holders. Up to now, not all available data on European level has been explored.

R&D-surveys in different countries

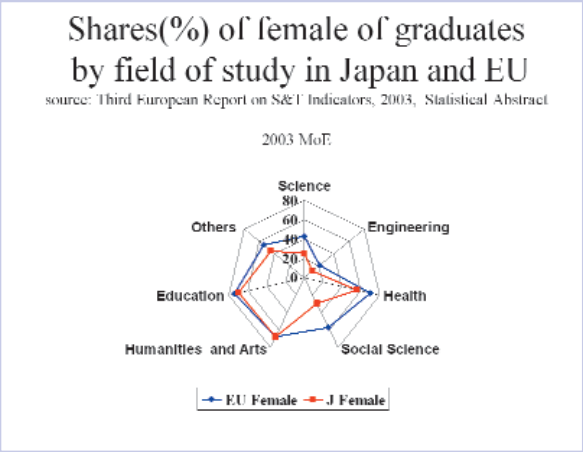
Laudeline Auriol from the OECD Directorate for Science, Technology and Industry gave an overview of the collection of R&D data in OECD countries. The basis for the R&D-surveys is the Frascati Manual, a

methodological framework with definitions and recommendations for all member countries. Data on researchers are recorded over many years without breakdown by gender. Nevertheless, there are still problems with availability, comparability and interpretation of the results. Improving the quality of data at national level will help to overcome some of the limitations.
Auriol referred to the novelty of gender-differentiated questions in R&D surveys. A recommendation to include such items was introduced in the 2002 revised version of the Frascati Manual. Up to now, nineteen countries out of thirty have reported data on female R&D personnel. The results from all countries with available data demonstrate that the participation of women in research in the business enterprise sector is significantly lower than their average participation in the research area in general.
The speaker accentuated the need for gender-specific data for all sectors of economy and all countries. Moreover, from a political point of view it is important to identify the types of qualification needed on the labour market. It is therefore necessary to obtain more information about the qualification and the field of science of working researchers. The development of a new field of science classification by the OECD Secretariat will probably be of help in this purpose.
In Japan, industry and society have been forced to change their structures in order to maintain the economic status. One effect was a rising participation of women in industry in the last twenty years. This was the starting point of Mizue Yamauchi Kissho and Yuko Ito. Their paper was presented by Mizue Yamauchi Kissho from the Japan Society of Science and Policy and Research Management. The speaker demonstrated that the absolute number of female researchers is still very small. In 2001, their overall participation amounted to some 11%, whereas in the business enterprise sector only 6% of all researchers were women. On the other hand, women' s share in the total labour force is more than 40%. The authors underlined that for this reason the basic conditions for female researchers have to be improved.
Concerning the different distribution of fields of study for female and male graduates in Japan Ito and Yamauchi Kissho observed a structure similar to that in EU countries: In natural sciences and engineering women are underrepresented, while female graduates dominate in health and education.



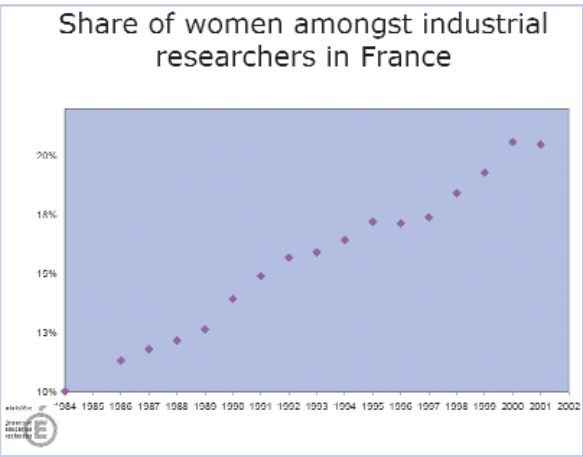
Presentation Laudeline Auriol, OECD

However, in social sciences the share of graduated women in Japan is relatively low compared to the average share in EU member states.
A steady increase in women's participation in industrial research activities was found in France. Here, the traditional R&D survey provides annual information on gender for both total R&D personnel and industrial researchers. Dominique Francoz from the French Ministry of Youth, National Education, and Research presented the development from some 10% women amongst industrial researchers in 1984 to more than 20% in 2001.
These figures correspond to the current age distributions of male and female researchers in the business enterprise sector. There are significantly more women than men among younger researchers whereas the opposite is true for the elder ones.
Data on age groups for researchers are available because France - in addition to the main R&D survey - has carried out an extra annual survey of researchers since the year 2000, which provides detailed information on qualification, field of science and age. Since all items in this regard are gender differentiated, there is a rich basis for gender-related analysis. The supplementary survey is mandatory and covers all firms with an annual R&D expenditure that exceeds 1.5 million Euro, whereas those with a smaller R&D amount are covered in a 50% sample survey.
Christa Revermann from the Stifterverband in Germany described the collection of gender-related data within the R&D survey for enterprises in Germany. Questions concerning total female R&D personnel as well as female researchers have been included since 1999. This data is not available for all recorded companies, however, one reason being that small firms with severe response problems receive an extremely short questionnaire containing



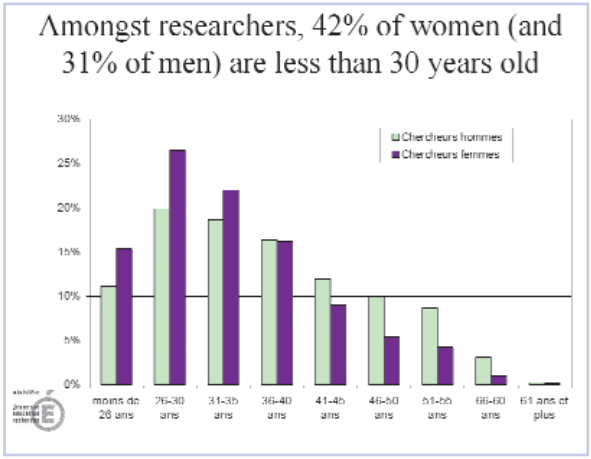
Presentation of Yuko Ito, National Institute of Policy Science and Technology, Japan, and Mizue Yamauchi Kissho, Society of Science and Policy, Japan.

some key questions without gender differentiation. Furthermore, some - predominantly large - enterprises did not answer the new questions. Consequently, in 2001 gender-differentiated data was available for almost one quarter of all R&D-performing units, which account for about 30% of all covered industrial researchers.
Since the collection and analysis of data is time-consuming for both respondents and survey-conducting



Presentation of Yuko Ito

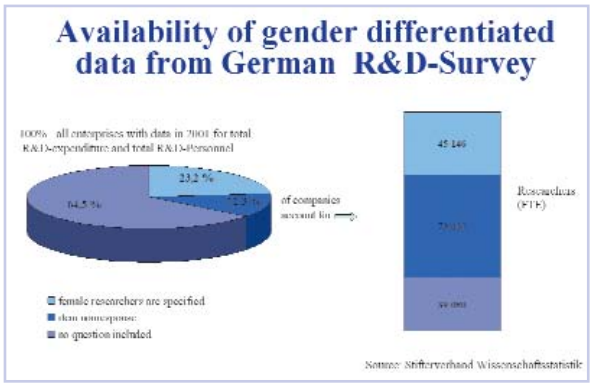
institutions, the speaker concluded, it is necessary to specify the demand for new figures also with respect to the benefits for the enterprises.
Some results were given on the basis of records with complete data on female personnel. Compared to



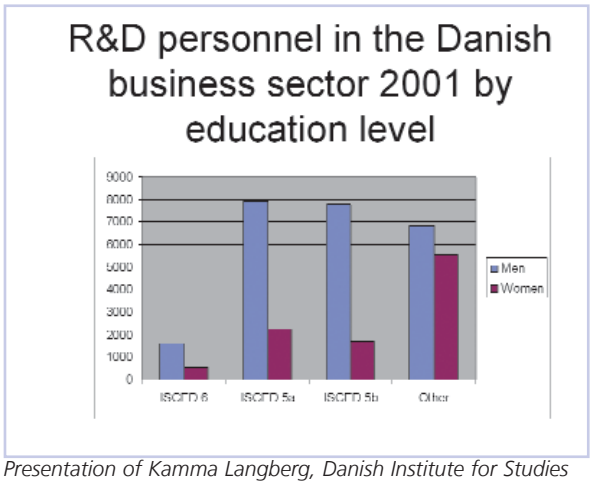
Presentation of Dominique Francoz, French Ministry of Youth, National Education and Research

other European countries the German figures are rather low, although there was an increase in the female proportion among researchers from around 9% in 1999 to some 11% in 2001. Between the industrial branches, typical differences were observed, e.g.,women account for more than 30% of industrial researchers in the pharmaceutical industry in contrast to some 7% in companies producing motor vehicles.

Combining quantitative and qualitative research
The Danish R&D statistic was introduced by Dr. Kamma Langberg from the Danish Institute for Studies in Research and Research Policy. The R&D survey in the Danish business enterprise sector provides head counts and full time equivalent for R&D personnel. Gender information is available and the education level is recorded on the basis of ISCED categories (International Standard Classification of Education). By this means, researchers working in R&D are defined as R&D personnel with an ISCED level of 5 or 6, which normally coincides with an university degree. One result from 2001 shows that the share of women among researchers is considerably smaller than for other R&D personnel.
The speaker attached importance to studies in other countries, which could help to improve the basis for gender-differentiated comparable data. Furthermore, she proposed to build networks between researchers in companies and in public or private research institutions. According to her observations, the role of female researches in innovative and creative research centres is generally more important than it is in other research areas.



Presentation of Christa Revermann, Stifterverband für die deutsche Wissenschaft.



Presentation of Kamma Langberg, Danish Institute for Studies in Research

Dr. Langberg's know-how from several Danish studies in the public sector also yields some recommendations to improve qualitative research. Quantitative and qualitative methods could be combined by the following steps:

- Getting a general picture from R&D statistics
- Selecting companies for case studies and placing them in their context
- Describing individual researchers in their context (= the company) by use of questionnaires
- Interviewing individual researchers.

The approach of combining both qualitative and quantitative research was also stressed by Prof. Dr. Beate Krais from the Technical University of Darmstadt in Germany. On the basis of her broad experience with empirical studies, she stated that the collection of specific data was essential, because the available database is not sufficient. As an example she referred to her study on women and men in physics in Germany, which was based on a written survey among members of the German Physical Society. This was a particularly suitable group for investigating the career development of women physicists.

Chair:
Prof. Dr. Hans de Wit,
TNO, President of the European Industrial Research Management Association (EIRMA), The Netherlands

Rapporteur:
Dr. Orna Berry,
Venture Partner, Gemini Israel Venture Funds Ltd., Chairperson, Lamda Crossino Ltd. And Riverhead Networks Ltd., Israel

Keynote Speaker:
Maria Caprile, Foundation Centre for European Initiatives and Research in the Mediterranean (CIREM), Spain

Panellists:
Laudeline Auriol, OECD Directorate for Science, Technology and Industry, France
Dr. Orna Berry, Venture Partner at Gemini Israel Funds, Israel
Helga Ebeling,
European Commission DG Research, Belgium
Dominique Francoz,
French Ministry of Youth, National Education, and Research, France
Yuko Ito, National Institute of Policy Science and Technology, Japan
Prof. Dr. Beate Krais, Technical University of Darmstadt, Germany
Dr. Kamma Langberg, Danish Institute for Studies in Research and Research Policy, Denmark
Christa Revermann, Wissenschaftsstatistik GmbH im Stifterverband für die Deutsche Wissenschaft, Germany
Mizue Yamauchi Kissho, Japan Society of Science and Policy and Research Management, Japan

Workshop Coordinator:
Christa Revermann, Wissenschaftsstatistik GmbH im Stifterverband für die Deutsche Wissenschaft, Germany

Workshop 5

Top Women in Industrial Research - The Relevance of Role Models, Networking, Mentoring

What can be done to make women in industrial research more visible, more powerful and to change the public image of industrial research?
By Isabel Beuter

Workshop 5 discussed questions of role models, networking and mentoring programmes to support women on their way to top management positions.

While it was agreed that a discussion on how to get women into industrial research in the first place (WS 1) and how to ensure career development (WS 2) was needed, the workshop participants also stressed the importance of having top women to lead the way. At the same time, several of the female participants emphasized that it was vital to make sure that what is needed are not "super women" but real role models.

Presentation of Susan Croft, ASC Training & Consulting, UK /USA

In her keynote, Susan Croft, USA, pointed out some findings of the WIR report that have to be considered when talking about women in industrial research. While there are few top women role models in Europe there are considerable differences for women in this sector, e.g., concerning participation, salaries, career opportunities, prestige and, of course, in the culture of childcare.

She also put together some key messages to send out to women scientists about a career in industrial research:
It was no surprise to the participants of the workshop that according to the presented Catalyst study "Women in Leadership - A European Business Imperative" 64% of women miss female role models and 61% of women miss mentoring[1].
On the other hand, everyone agreed that this does not mean that there are no role models or mentoring schemes. This was stressed by the speakers of the workshop who presented good-practice examples from their companies.

Presentation of Meredith Moore, Catalyst, USA

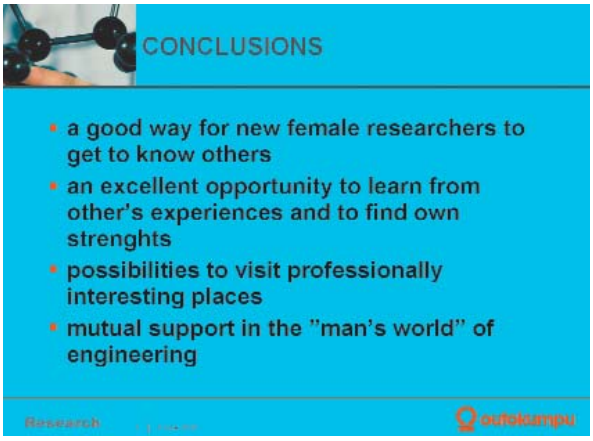
Meredith Moore from Catalyst, USA, also presented some recommendations for companies that universally stressed the need for management commitment and organisational structures with built-in accountability.
Hugo Bagué from Hewlett Packard Europe then gave examples on how to put these recommendations into practice:
In June 2003, HP organised a meeting of 50 female managers to create a Women Network Group within HP. The members of the network are planning to meet every 6-12 months in the future.
For a long time, women at HP have actively participated in external networks, i.e. the Women's Engineering Society and WITEC (Women in Science Engineering and Technology) and will, of course, continue to do so.
Even more importantly, there are several structural guidelines for HR Management:

- In order to ensure that in every shortlist for a new job (especially for internal vacancies)

[1] For this study Catalyst interviewed 150 men and 500 women from 20 European countries, including EU member states and candidate countries.

there is at least one woman, managers have to work with their so-called "talent suppliers" before closing the list.
- There is a specific women talent manager review, by business and by country, including also a specific succession plan.
- Aware of the urgent need for change, HP decided that they could not wait for women to climb the ladder slowly. They therefore developed the Accelerated Development Program (ADP), focusing on high-potential managers.

These guidelines underline HP's top-down commitment, secured also by regular progress reviews at board meetings to win management attention and get a strong focus from everyone at the top.
The importance of structural guidelines was underlined by the presentation of Dr. Gill Samuels from Pfizer, U.K. Only through showing commitment from the top, i.e. with an established diversity programme and clear goals and objectives concerning recruitment, promotion, training and cultural change, will the business case behind it all be honoured.
Dr. Samuels then pointed out that a lack of management appreciation for diversity is one of several perceived impediments to career progress in research that are, although to a different extent, true for men and women. They also include a lack of clarity about promotion, the fact that promotion seems easier if a scientist is extrovert and competitive and, last but certainly not least, family commitments.



Presentation of Maja Riekkola-Vanhanen, Outokumpu Research,

The workshop then shifted its attention to examples of how to support women scientists, either with or without the support of top management.

Marja Riekkola-Vanhanen from Outokumpu Research Oy, Finland, went on to present their internal network NICE that was set up 14 years ago. All women research scientists with a university degree in technology or natural science are welcomed to join the network. NICE has organized meetings and excursions to Outokumpu's own plants and also to other industrial plants, as well as social events, including Christmas lunches, museum visits and sauna evenings. It has proven to be a good way for new female research scientists to get to know others, to deepen their knowledge of local industries as well as to offer one another mutual support in what is traditionally the "man's world" of engineering.

One other good practice example was the French cross-company network Inter Elles, a possible way forward, especially for small and medium sized (SME) companies or companies that do not yet have enough top women for their own internal net work - not mentioning the advantages of looking across the boundaries of company restrictions and demands.
Sylvie Rançon from Schlumberger, France, who presented the network, pointed out that Inter Elles offers support for new networks trying to establish themselves.
Some of the ideas Inter Elles has put into practice are:

- Support women, help them to progress while keeping their own identity
- Propose actions to help diversity progress at all levels
- Annual conference on Women's day (next one: March 8th, 2004, about Europe and Women)
- Monthly meeting of the committee
- Workshops on several subjects

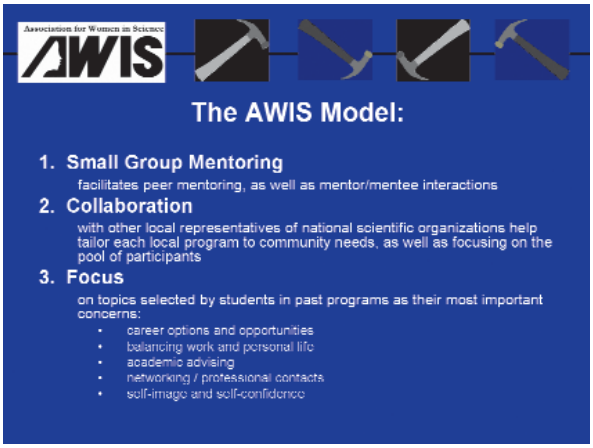
Dr. Isabel Rodriguez-Maribona then presented mentoring Programmes in her research centre LABEIN, Spain, to strengthen women's role in industrial research. At LABEIN, mentoring is part of the "Gender Issues Action Plan" and over the last 10 years the number of women in influential positions has risen considerably. Thus Dr. Rodriguez-Maribona underlined the importance of top management commitment as one key factor - a result that has to be considered the major issue of the conference.
It also became clear that while mentoring is widely spread these days there seem to be too few guidelines and differentiations according to the different fields of work. This led to a discussion on trying to

implement a special mentoring programme that meets the needs of women in industrial research. Prof. Dr. Barbara Schaeffer-Hegel from the European Academy for Women in Politics and Business Berlin, Germany, proposed to set up a Centre for Women Leaders in Industrial Research (CWIR) in order to make top women visible, to enhance their standing and their motivation for professional advancement. The objectives of the centre could be:

- to organize trainings for top women in industrial research as well as for high- potential students
- to organize trans-national mentoring programmes for top women and for women on their way to top positions in industrial research
- to enforce trans-national networking between top women to bring together women from different countries, different companies, as well as from different generations and political parties and from different sections of professional life
- to provide for regular PR and presence in the public of individual women scientists or groups of women and their excellent performance in industrial research

Presentation of Isabel Rodriguez Maribona, LABEIN, Spain

The idea of such a centre in many ways took up one of the initial ideas of the keynote speech that had raised the question of whether to establish a European Association of Women in Industrial Research might be one way of helping to make women in industrial research more visible.
Catherine Didion from AWIS, Association for Women in Science, based in the USA, presented her work and gave ideas on how to start off and keep an association of that kind going.



Presentation of Catherine Didion, AWIS, USA

The overall message of the workshop was:
It has to be understood by everyone that bringing women into industrial research and top management is a business case. The promotion of women and diversity have to be management objectives and have to be measured regularly. Networking and mentoring need company support so that role models can take part in networking and mentoring schemes and with this may help to develop new role models. There are plenty of ideas and best-practice examples of networks and mentoring programs that only have to be used to develop more and possibly specialized programs.

Recommendations of the workshop included:

- A cross-company, cross-institutional and international career training for women scientists and engineers could be organised to improve information, networking and negotiating skills.
- Mentoring schemes on sectoral and international level could be developed, e.g., a special mentoring programme for women in industrial research.
- The public image of women in industrial research has to change and the visibility of women researchers in the media has to be increased. One way of achieving this is the publication of a Top-50 list of women scientists in Europe.
- Indicators on women in senior positions in private and public research have to be included in national and international benchmarking on women in decision making.

Chair:
Rosanna D'Antona,
Managing Director and founder, D'Antona & Partners, Italy

Rapporteur:
Niels Christian Nielsen,
Executive Chairman, ImmediaTV Inc., USA

Keynote Speaker:
Susan Croft,
Founder and Partner, ASC Training & Consulting, United Kingdom/USA
Catherine Didion,
Association of Women in Science, AWIS, USA
Marja Riekkola-Vanhanen,
Outokumpu Research Oy, Finland
Hugo Bagué,
Hewlett Packard, Switzerland
Dr. Isabel Rodriguez,
Fundación Labein, Spain
Meredith Moore,
Catalyst Inc., USA
Dr. Gill Samuels,
Sandwich Laboratories of Pfizer Global R&D, United Kingdom
Silvie Rançon,
Schlumberger R&D Centre, France
Prof. Dr. Barbara Schaeffer-Hegel,
European Academy for Women in Politics and Business (EAF), Germany

Workshop Coordinator:
Isabel Beuter,
Center of Excellence Women and Science - CEWS, Germany

Part 3 - Closing Session: Reflections on the Conference

Making the business case for gender diversity - a group of companies takes action

If companies are to raise their attractiveness as employers among qualified women, they must take action. The following examples show how companies improve the numbers and careers of women in industrial research.

Susan Bowick, Executive Vice President, Human Resources & Workforce Development, Hewlett-Packard Company

Yesterday, we kicked off the programme with a vision of 2020 and perhaps having a female CEO - this is a vision I am already living in. At HP, we have set very high goals in terms of becoming a best place to work as well as one of the world's best companies to do business with. And in order to achieve that, we see diversity and inclusion as very key pieces.
It has been a multiple-year journey to reach this change. There is no magic, there is no "one" instrument or tool that changes things. What we really look at is to create a work environment where everyone can contribute at their very fullest and where everyone has to bring all the elements of who he or she is as a person to the job. It is good business because you have a more committed, competitive work force when people have their head, their heart, and their energy with them every day.
Engaging in a dialogue between the senior leaders and the employees in a company is really the heart of the matter of how you create change. I will give you two examples of how diversity and gender equality at HP are realized:
My first example is of a manager that I have worked with. At the time, he had just moved to the US from Spain. He personally experienced what it was like to be the only person working in an institution that had a different native language, a different style of working and different expectations. He had been injected into a system and a culture that was very different from what he was used to in Barcelona. He became one of my best line management partners in the conversation about gender and diversity. I had agreed with him that he would kick off a diversity awareness meeting for our most senior executives from around the globe and he talked personally about what it was like to not feel as included or understanding the code words that went on. He co-hosted with me our diversity and inclusion leadership council at the company.
Now for a more systematic example. Back in the mid-80's, when we did start tackling gender equality inside HP, we found out that men and women really did not know exactly how to work together. We structured workshops called "Men and Women Working Together". We started with the most senior team, the executive of the business that I was in. We spent one day in a facilitated session, first starting with the rumours that we had about men and women, e.g., women felt that men made decisions when they went to the men's room. Men, stereotyped, tended to think that women were emotional and could not handle tough business decisions. So we got the stereotypes out.

Gill Gordon, Director of Personnel, North and Central Europe, Schlumberger LTD UK

I have been involved with the gender diversity side in particular since 1994 and I have certainly seen how the company has changed over the last decade. I can remember going back to an appointment of mine, being the first woman on a management team in the UK. The manager had to be persuaded to take me onto the team because at that time it was fairly revolutionary. And we became great buddies after a year. When I next moved on, the difficulty I had to face was trying to get him to move out of the management team. That was in 1988. When I look at where we are today, we still have an enormous way to go, but there is a momentum building up. 25% of our recruits consistently coming in are women, in some of the engineering areas, e.g., even up to 30%. We are starting to see that critical mass.

Peter Ramm
Vice-President Policies and Legal Issues for Global Personnel, Siemens AG

It is only five years ago that we woke up, initiated by just looking closely at the diversity projects of our subsidiaries in South Africa and the United States. We discovered very quickly that this is an issue of global relevance. Diversity not only deals with gender aspects, but also with cultural, religious, national and ethnic aspects. First of all, we initiated a global guideline for diversity within Siemens - of course there is not a "one fits all" concept. This has to be done country-wise. We realized that we have an especially unsatisfactory situation concerning gender in Germany. This has many political, traditional, and historical reasons which one company cannot change. Nevertheless, Siemens tried to take initiative and started a project for women in leadership functions. Since then, the percentage of women in leadership functions has risen from 5 to 7%. We are monitoring this process very closely and are optimistic that the situation will improve in the future. We try to sensitise people to these subjects and to integrate gender aspects into our HR instruments. Still, it is difficult to get all these ideas from paper into the minds.

Questions from the audience

After these opening statements, the company representatives answered questions from the audience regarding flexible working hours, equal payment patterns and the implementation of the diversity concepts outside the headquarters. We summarised the answers as following:

Susan Bowick: For example, as of this year, we have set company-wide a metric to increase the number of women in executive positions. Now that might seem like a pretty strange goal given that three of the company's ten executive council members are women, but when you get outside of the US it is not as easy. We do not have the same percentage of women, e.g., in executive and officer positions in EMEA and Asia. So we have set specific goals, and we track our progress globally.

Peter Ramm: First of all, we make up the business case for our local managers. We are not an institution to create equality, we have to make sustainable business success. A high-tech company like Siemens must in the first place drive innovation and creativity. We are convinced that if you look at innovative programmes only through the perspective of white males you will get solutions of course, and not always bad ones, but if you look at such programmes under many different perspectives, there is a chance to get better solutions. And this is the simple business case. How do we really implement such a policy worldwide? We have designed some kind of management system that promotes, sets targets, monitors and controls the steps which must to a certain degree remain country-specific. We use the system as a part of our standard audit catalogue but we do not fix certain quotas.

Gill Gordon: There are really two parts to your question. The first part is, what do we do as far as networking and mentoring is concerned? We do not have something like a global mentoring programme but what we find very successful is networking at local level. There are very strong local networking groups for women in our key countries. We have had a number of those groups going now for years very successfully.
So, the second part of your question. I mentioned that I have been involved in the gender diversity initiative since 1994. At that time, I was supporting a senior management group that for the first time were trying to tackle the issue of gender diversity. And I had the thankless task of trying to put all the statistics together at a time when we absolutely did not have a worldwide database. We had about 6% professional women. It is very encouraging to see that the number has more than doubled in ten years. We have succession planning in the company which means that for every management position there is a list of three people that could do the job now or could do the job in the future. Every manager is expected to have at least one woman on that list.

Reflections on the conference

Prof. Dr. Teresa Rees
Cardiff University

Conference rapporteur Teresa Rees summarised the main results of the event. She welcomed the openness of the participating companies, yet also called for a change in company culture towards being more inclusive, and also towards fostering diversity and creativity.

I attend a considerable number of conferences but this one has been quite exceptional. Senior figures from R&D industries across Europe and beyond have come here to Berlin to testify publicly that they are convinced of the business case to recruit, retain and promote women in their companies.
There are three elements to this business case that we have heard about from companies here. The first is a clear acknowledgement of the present and projected shortage of qualified people in science, engineering and technology. This is a shortage to which the Council of Ministers have drawn attention. Indeed, their commitment to an average of 3% of European Union GDP being spent on R&D by 2010 means there is an estimated need for about 700,000 more qualified researchers.
The second is an awareness that women are fast becoming a very significant group of consumers, both in an individual capacity but also as senior buyers for the organisations for which they work. To ignore women's purchasing power is a dangerous strategy. More women will be needed in research and development, as well as a broader spectrum of men, to ensure that products and services are designed with the growing diversity of consumers in mind.
Thirdly, there is growing evidence that diversity is a key factor in generating creativity and innovation. As AstraZeneca say, 'cloned people produce cloned ideas'. Women are needed for the variety of experiences and perspectives they can bring to the table - and the laboratory.
Having accepted the business case however, opening companies up to women researchers is far from a straightforward matter. We have heard from companies how long-term strategic policies are needed to modernise human resource (HR) management practices. The 'old boy's network' is outmoded as a method of recruiting talent. Transparent, merit driven mechanisms for assessing people are needed. Zero tolerance of bullying and harassment is essential. Company policies that value individuals in all their diversity are vital. Gender pay audits are helpful, to ensure that the value of individuals and groups is appropriately rewarded. HR policies need to acknowledge and respond to the differences among groups, while recognising that one size does not fit all: stereotypical assumptions must be avoided. work-life balance is an issue for all employees, men as well as women. Companies need to develop imaginative and flexible policies to meet a wide variety of needs that tend to change over the life course. Listening to employees on an individual basis about how they would like to manage their work-life balance can lead to creative solutions that value individuals, reduce stress and promote effective working. They are also good for retention and growing company loyalty. Finally, we heard how important targets can be - 'if it gets measured, it gets done'!
We have heard from a range of companies, however, that these are just the first steps towards the essential organisational and cultural change necessary for women, as well as men, in all their diversity, to maximise their potential. Some companies that have been successful in their policies to recruit and retain women in R&D report how they reached a critical mass but then found they could progress no further. They needed to move out of their comfort zone, to re-examine the issue, listen to their employees and try new approaches to move beyond that threshold. It is important to avoid stereotyped assumptions in the process about identifying high potentials. Some companies spoke of the need for 'subtle communication' channels (listening, again). We heard of the need for ownership of the agenda to be both 'top-down' and 'bottom-up', and to be built into performance review mechanisms. We learnt how effective role models, mentoring and networks can be in supporting the growth and development of women in industrial research, both for those in

the early stages of their careers, those in mid career or returning to work and for women in the boardroom!

There is a wealth of experience among the companies represented here. They have been disarmingly frank about their problems and failures as well as their successes. There is no quick fix to this issue. More dialogue and debate is needed, as well as more research and more opportunities to learn from best practice. Perhaps there should be a follow up conference?

The work of the Women and Science Unit in the European Commission's Research Directorate-General has been invaluable. It has collected and disseminated statistics where none existed before, documented case studies of good practice, and launched this 'wake-up call' to European industry on the need to make much better use of women in R&D.

The statement from the group chief executive officers responding to this wake-up call, led by Mr. Andrew Gould of Schlumberger, is a very exciting initiative. They have all been working successfully on this issue for some time and are now encouraging others to follow their example. They are committed to something far beyond a small, tokenistic improvement in numbers: they are leading the way in fundamental organisational and cultural change. This is very welcome, and just as well. Women have been knocking on the door of industrial research for a long time. Now it seems, the door is opening. However, there is just one more thing. Now inside, women researchers would like to change the furniture a little, to make some minor adjustments here and there. Well, in fact, many women (and men) would like to change company cultures to make them more inclusive, more open to diversity and better climates for fostering creativity!

Greeting from the Italian and French Ministers of Education and Research

Letizia Moratti
Minister of Education, University and Research

Distinguished delegates, ladies and gentlemen, the Italian Minister of Education, University and Research, Letizia Moratti, who regrets not being able to attend, has asked me to extend her best wishes to the participants.
The issue the conference dealt with is one of the most relevant in the process towards reaching the Lisbon and Barcelona objectives, and this meeting shows that the European dimension is most adequate for reaching pertinent solutions in order to facilitate the process of innovation, economic development and social integration. To reach the Barcelona objective, research investment in Europe should grow at an average rate of 8% annually, made up of a 6% growth rate for public expenditure and a 9% yearly growth rate for private investments. Industry plays a leading role in research and development, but fundamental changes in the working culture are required to stay ahead in a competitive environment. So, for Europe to achieve the necessary increase in highly qualified research personnel, women must be a major part of the enlarged community of industrial researchers.
'Women in industrial research' is a new topic in the European Commission research policy. The present Italian EU Presidency, and specifically the Italian Minister of Education, University and Research, intends to give support and visibility to the question of promoting women in research and science by outlining the very high importance of this conference in Berlin. It is a privilege for me to express, on behalf of Mrs. Letizia Moratti, the deep appreciation of the Italian authorities for holding this conference in Berlin, as well as the fervent wish that its results may have a most favourable impact thanks to an active and constructive contribution by all participants.

Francesca Cantù
Ministry of Education, University and Research
University of Rome III

Claudie Haigeneré
Former French Minister for Research and New Technologies

In Ms Haigneré's view, the conclusions of the WIRSTRATA working group, which were presented at the Conference, will play a key role in encouraging women to take up a career in research. The report and the Conference highlighted a number of problems which are at the heart of French research policy.
In her communication, Ms Haigneré stressed the urgent need to "speed up changes in Europe, since many women with science degrees are neither pursuing an academic career nor working in innovative companies that offer a high research potential". It is essential to identify the reasons for this, and efforts over the next few years should focus on recruiting more scientists, in particular for industry.
In France, only 20% of industrial scientists and engineers are women, and only few women are willing to risk setting up innovative firms. Specific schemes have been set up by the Mission for parity in research and higher education, and the Minister placed emphasis on the initiatives which have been taken to prepare the ground for the future.
In 2004, the Research Minster will be publishing a White Paper on women in private research within the specific conditions of French research. This statistical analysis will be backed up by a series of qualitative investigations to identify the bottlenecks as well as the expectations of women scientists working in industrial research. The White Paper will provide a basis for establishing the indicators needed to create a system for career monitoring and for making recommendations to institutions and those responsible in the private sector and industry.
The White Paper will send out a strong message at a time when the European Union has set itself the target of increasing R&D spending to 3% of the GDP by 2010.

Michèle Baron
Ministerial Delegate for Research and New Technologies, France

Biographic Details

Antonietta Albanese
is Professor of Social Psychology at Milan University, Department of Social and Political Studies. She acted as co-ordinator of the second-level Master in Environmental Policies and Economics of Milan University and was in charge of selection and orientation. Since 1998 she has been working as a scientific co-ordinator of cooperative research between Milan University and Confindustria (Italian Association of Employers). She has a degree in philosophy and a post-degree specialization in psychology from Milan University, Faculty of Medicine.

Laudeline Auriol
is Administrator at the OECD Directorate for Science, Technology and Industry where she is responsible for the measurement of human resources devoted to science and technology. She has a ten-year experience on issues related to science and technology indicators in OECD and non-OECD countries. Previously, she worked in the Economics Department of the OECD and started her career teaching mathematics at the French High School of Los Angeles, USA. She holds a Master Degree in statistics and a post-graduate degree in demographics.

Hugo Bagué
is Vice President Human Resources EMEA. He is focused on delivering best-in-class HR services and programs designed to promote the continuous development of a world-class, winning HP Europe, Middle East and Africa (EMEA) workforce. Most recently, Bagué has served as Vice President of Human Resources for Compaq Computer EMEA where he was responsible for the design and implementation of Compaq's human resources strategy. Bagué is also lecturer in human resources at the United Business Institute in Brussels, Belgium.

Orna Berry
is Venture Partner in Gemini Israel Funds Ltd., and Chairperson of Lambda Crossing Ltd. and the former chair of Riverhead Networks, Inc. sold to Cisco. Orna is a former Chief Scientist of the Ministry of Industry and Trade of the Government of Israel, where she was responsible for implementing government policy towards industrial research and development. She is also co-founder of ORNET Data Communication Technologies Ltd. She received her Ph.D. in Computer Science from the University of Southern California.

Isabel Beuter,
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Agenda

Agenda

10 October 2003

15:30 Registration & First Informal Meeting of Networks
Researchers, politicians, managers from the main sectors of industrial research have the opportunity to establish networks in different areas including:

ICT/ Bank	Life Sciences/ Biotech	Energy/ Environment	hemistry/ Pharmaceutics	Food Quality	Transport	Private/ Non-Profit

16:30 Welcome by the Host: Ulrike Ufert-Hoffmann, Dresdner Bank

Opening Session:
"Women in Industrial Research (WIR) - Speeding up Changes in Europe"

Speakers:
Wolf-Michael Catenhusen, State Secretary of the Federal Ministry of Education and Research
Philippe Busquin, EU Commissioner for Research
Prof. Dr. Helga Rübsamen-Waigmann, Vice President Bayer HealthCare, Head of Antiinfective Research, WIR Expert Group (chair), Member of EURAB, Germany
Andrew Gould, Chairman and CEO, Schlumberger Limited, France

Moderation: Conny Czymoch

18:30 Break: Aperitif

19:00 Presentation of the WIR Report "A wake up call for European Industry" and of the Study on "Women in Industrial Research (WIR) – Statistical Analysis and Good Practices in Companies"
Prof. Dr. Helga Rübsamen-Waigmann, Vice President Bayer HealthCare, Head of Antiinfective Research, WIR Expert Group (chair), Member of EURAB, Germany
Prof. Dr. Teresa Rees, School of Social Sciences, Cardiff University, WIR Expert Group (rapporteur), UK
Prof. Dr. Danièle Meulders, Department of Applied Sciences, Université Libre de Bruxelles, Belgium

20:00 Reception & Dinner
Second Informal Meeting of Networks

ICT/ Bank	Life Sciences/ Biotech	Energy/ Environment	hemistry/ Pharmaceutics	Food Quality	Transport	Private/ Non-Profit

11 October 2003

9.15 Workshops

WS1 Young Scientists – How to motivate more young women to pursue careers in industrial research
What can companies, schools, universities do?

Chaired by: Dr. Michael Sanderson, CEO, SEMTA (Sector Skills Council for Science, Engineering and Manufacturing Technologies), United Kingdom
Rapporteur: Pierre Bismuth, Vice-President Personnel, Schlumberger Ltd., France
Keynote speaker: Barbara Schwarze, Managing Director, Center of Excellence - Women in the Information Society and Technology, Germany
Speakers: Prof. Dr. Antonietta Albanese, Università degli Studi di Milano, I; Cristina Bonilla, Universidad Pontificia Comillas, ES; Müge Eczacioglu, Kibar Holding, TR; Dr. Christine Heller del Riego, Universidad Pontificia Comillas, ES; Blanka Kocikova, University of Technology Kosice, SK; Prof. Dr. Peter Pirsch, Universität Hannover, D; Dr. Peter Ramm, Siemens AG, D; Sylvia Stange, Deutsche Telekom AG, D; Gay Tischbirek, École d'Ingénieurs (EPF), F; N.N. Fraunhofer Institut Arbeitswirtschaft und Organisation, D

Coffee Break 10.45-11.00

WS2 Careers for women in industrial research and good practices of companies
What can companies do to promote women, to change the culture of research, the framework conditions and to have more women on the top level?

Chaired by: Dr. Ragnhild Sohlberg, Vice-President, Corporate Centre, Norsk Hydro ASA, WIR Expert Group (joint chair), Member of EURAB, Norway
Rapporteur: Dr. Jenny Holmes, R&D Diversity Director, AstraZeneca, United Kingdom
Keynote speakers: Dr. Brigitte Mühlenbruch, Managing Director, Center of Excellence Women and Science - CEWS, Germany,Susan Bowick, Executive Vice President of Human Resources and Workforce Development, Hewlett-Packard Company, USA
Speakers: Hans W. Jablonski, Gabriela Hahn, Ford Werke AG, D; Dr. Dirk Meints Polter, Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V, D.; Amy Simpson, Schlumberger Ltd Paris, F; Linda Taylor, IBM UK; Dr. Venceslava Tokarova, Research Institute of Inorganic Chemistry - VUANCH, CZ

WS3 Enhancing the participation of women in innovation and entrepreneurship
What can be done to increase the number and participation of women in the innovation process?

Chaired by: Dr. Françoise Soussaline, President and founder, IMSTAR S.A, France
Rapporteur: Carmen Vela, Managing Director, Ingenasa, Spain
Keynote speakers: Gertrud E. Bohlin, District Manager, Confederation of Swedish Enterprise, Regional office Malmö, Sweden; Prof. Dr. Sara Carter, University of Strathclyde, United Kingdom/ USA
Speakers: Christine Crandell, Forum of Women and Entrepreneurs - FWE, USA; Christina Diegelmann, Ministry of Economy Baden-Württemberg, D; Maila Hakala, FI; Eva Heckl, KMU Forschung Austria, AT; Elena Nielsen Garcia, European Commission DG Enterprises, BE; Dr. Friederike Welter, Rheinisch-Westfälisches Institut für Wirtschaftsforschung, D

WS4 Improving the knowledge base on women in industrial research – What are the facts and figures
What needs to be done to have more gender-differentiated comparable data on firm level, sectors, countries? How can qualitative research be improved?

Chaired by: Prof. Dr. Hans de Wit, TNO, President, European Industrial Research Management Association (EIRMA), The The Netherlands

11 October 2003

WS4

Rapporteur: Dr. Orna Berry, Venture Partner, Gemini Israel Venture Funds Ltd; Chairperson, Lamda Crossing Ltd. and Riverhead Networks Ltd., Israel
Keynote speaker: Maria Caprile, Fundació Cirem - Foundation Centre for European Initiatives and Research in the Mediterranean, Spain
Speakers: Laudeline Auriol, OECD DSTI/EAS, F; Dominique Francoz Bureau des Études Statistiques sur la Recherche, Ministère de la Jeunesse, de l'Éducation Nationale et de la Recherché, F; Yuko Ito, National Institute of Policy Science and Technology, JP; Prof. Dr. Beate Krais, Technische Universität Darmstadt, D; Kamma Langberg, The Danish Institute for Studies in Research and Research Policy, DK ; Christa Revermann, Wissenschaftsstatistik GmbH im Stifterverband für die Deutsche Wissenschaft, D; Mizue Yamauchi Kissho, Toho University, JP

WS5

Top women in industrial research – The relevance of role models, networking, mentoring
What can be done to make women in industrial research more visible, more powerful and to change the public image of industrial research?

Chaired by: Rosanna D'Antona, Managing Director and founder, D'Antona & Partners, Italy
Rapporteur: Niels Christian Nielsen, President and CEO, Catenas Inc., Denmark
Keynote speaker: Susan Croft, Founder and Partner, ASC Training & Consulting, United Kingdom/ USA
Speakers: Hugo Bagué, Hewlett-Packard International Sàrl GmbH, CH; Dr. Ellen De Brabander, DSM Fine Chemicals BV, NL; Catherine Jay Didion, AWIS Association for Women in Science, USA; Meredith Moore, Catalyst Inc., USA; Sylvie Rançon, Schlumberger R&D Centre, F; Marja Riekkola-Vanhanen, Outokumpu Research Oy, FI; Isabel Rodriguez-Maribona, Fundaçión Labein, ES; Dr. Gill Samuels, Pfizer Global Research & Development, UK, Prof. Dr. Schaeffer-Hegel, Europäische Akademie für Frauen in Politik und Wirtschaft Berlin e.V, D

12:30 Lunch & Third Informal Meeting of Networks

ICT/ Bank	Life Sciences/ Biotech	Energy/ Environment	hemistry/ Pharmaceutics	Food Quality	Transport	Private/ Non-Profit

Closing Session/ Panel

- CEOs: Making the business case for gender diversity - A group of companies takes action
  Speakers: Susan Bowick, Executive Vice President of Human Resources and Workforce Development, Hewlett-Packard Company, USA; Pierre Bismuth, Vice President Personnel, Schlumberger Ltd., France; Dr. Peter Ramm, Vice-President Policies and Legal Issues for Global Personell, Siemens AG, Germany; John Rivers, Director Human Resources, Rolls Royce, United Kingdom
- Results & proposals of the five workshops – by the rapporteurs (Members of the WIR Expert Group):
  Prof. Dr. Teresa Rees, School of Social Sciences, Cardiff University, United Kingdom; Pierre Bismuth, Vice-President Personnel, Schlumberger Ltd., France; Dr. Jenny Holmes, R&D Diversity Director, AstraZeneca, United Kingdom; Carmen Vela, Managing Director, Ingenasa, Spain; Dr. Orna Berry, Venture Partner, Gemini Capital Fund; Chairperson, Lamda Crossing Ltd. and Riverhead Networks Ltd., Israel; Niels Christian Nielsen, President and CEO, Catenas Inc., Denmark
- Development of alternatives for future activities: Dr. Rainer Gerold, Director, European Commission, Directorate-General Research; MinDirig Hartmut Grübel, Federal Ministry of Education and Research, Germany

Moderation: Conny Czymoch

European Commission

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Speeding up changes in Europe - **International Conference on Women in Industrial Research,**

Berlin, October 10 - 11, 2003

Europe needs more women in industrial research - and more women studying science and engineering. How can this be achieved? What are the best methods to promote women in industrial research? More than 350 experts from over 40 countries met in Berlin to exchange ideas and discuss.

Based on the WIR-report and the WIR-study, high representatives from industry, research and politics debated about the urgent business need to improve gender diversity in European research. The "Wake-up Call from CEOs" was launched, a position paper signed by CEOs of different R&D companies in Europe who committed themselves to increasing the talent pool of researchers in Europe by doubling the number of women in science and engineering and by ensuring that their skills will be used and further developed by industry.
In five workshops and three plenary sessions, recent studies and best practices, the relevance of role models, the framework conditions of industrial research, the role of universities and entrepreneurship were presented in order to recommend key activities and further steps.

The present report contains a compilation of the main conference contributions, from the plenary sessions and workshops to the closing session and final reflections. It includes the agenda of the conference as well as a speakers' list with bibliographic details and a participants' list.

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