ladybizIT

REFLECTIONS ON WOMEN IN ENTREPRENEURSHIP AND ICT | A READER

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Emerging Technologies & Services
PROJECT LEADER & COORDINATOR

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European Centre for Women and Technology

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HELLENIC PROFESSIONALS INFORMATICS SOCIETY

Education and Culture DG
Lifelong Learning Programme

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'ladybizIT': Women Entrepreneurship on the verge of ICT

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www.gender-it.eu

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REFLECTIONS ON WOMEN IN ENTREPRENEURSHIP AND ICT | A READER

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FOREWORD

FRAMING THE ISSUE: THE 'ladybizIT': WOMEN ENTREPRENEURSHIP ON THE VERGE OF ICT PROJECT (www.gender-it.eu)

It is a fact, that women constitute only 34% of entrepreneurs in the European Union, often facing greater difficulties than men in starting up a business and accessing finance and training, while it is estimated that women entrepreneurship could be a major source for increasing European level economic growth and competitiveness. One of the major obstacles for women to take the option of European entrepreneurship is the limited access and use of ICT tools. Encouragement of female entrepreneurship growth is thus a high European priority. The European Commission, in the frame of the Small Business Act urging to "Create an environment in which entrepreneurs and family businesses can thrive and entrepreneurship is rewarded", has already initiated concrete actions aiming to promote women entrepreneurship such as the European Network of Mentors for Women Entrepreneurs (see Greek part www.businessmentors.gr), the European Network of Female Entrepreneurship Ambassadors and the European Network to Promote Women's Entrepreneurship (WES).

'ladybizIT' is addressing the aforementioned needs by promoting European projects, representing a great variety of European countries / transnational consortia, that could facilitate women entrepreneurship growth and development at European level. 'ladybizIT' suggests existing EU solutions and means, that foster women entrepreneurship; it identifies markets; it provides spotlight trends on the role of women in sustainable economic recovery; it informs on recent experiences and know-how; and, it raises awareness among women on the dynamic process of entrepreneurship in an emerging knowledge-based society. The ultimate goal is to have **more informed women on the existing EU tools and projects,** as well as on the current status of women entrepreneurial growth at European level and the opportunities offered, that will facilitate them to start up their own business. It is envisaged that women will gain the advantage of the opportunities provided by ICT tools to pursue entrepreneurship and increase their entrepreneurship participation rate in the European economy. Thus, 'ladybizIT' motivates European women, regardless of age and origin, to learn what the European Union Lifelong Learning Programme can do for them, by offering them a personal development advantage and a new career path, through the access and use of available Information and Communication Technologies (ICT). In brief, 'ladybizIT' encourages women to launch their own sustainable businesses through the use of available ready-to-use ICT tools!

More specifically, 'ladybizIT' presents 12 European co-funded projects, already identified and evaluated to meet the quality criteria established by the project expert partnership, that focus on women entrepreneurship and how ICT facilitates and possibly fosters women entrepreneurship.*

* Please refer to the list of the 12 European projects on the last page of the booklet

THUS, THE PROJECT

- Promotes Lifelong Learning interventions amongst current and future women entrepreneurs through specific project outputs;
- Encourages and motivates women, regardless of age and origin, to learn what Lifelong Learning Programmes (LLP) can do for them, by offering them a personal development advantage and a new career path, through the access and use of available ICT;
- Focuses on solutions and means, such as the use of ICT, that foster women entrepreneurship;
- Encourages women to launch their own businesses, identifies markets, provides spotlight trends on the role of women in sustainable economic recovery;
- Disseminates and informs on recent experiences and know-how and raises awareness among women on the dynamic process of entrepreneurship in an emerging knowledge-based society;
- Builds an informal sustainable network between all the presented projects and the events' participants of 'ladybizIT'.

'ladybizIT' builds up a dialogue through a set of interlinked and complementary dissemination actions that culminate into the European Conference and Show Case **"More technologies? More women entrepreneurs!" (6/11/2012 - Athens, Greece)** with the ultimate aim to present the useful results of 12 European projects, mostly under the umbrella of the **EU Lifelong Learning Programme 2007-2013,** in order to make those results available for further transfer to other countries around Europe, with a strong innovative character, that upgrades the level and quality of Vocational Education and Training (VET) at large. The presentation of best practices could set the grounds for future innovative practices to be developed, that will build on previous results with a potential to be replicated in different VET systems.

The European project 'ladybizIT' is being implemented by the following partners:

- **Militos Emerging Technologies & Services (www.militos.org)** offers an integrated range of innovative consultancy services in a wide spectrum of fields, such as Entrepreneurship, Employment, VET, Agriculture, Culture, Media, R&D, etc. Its expertise includes in particular, business development, communication, dissemination, media relations, event management and information campaigns. The company has an outstanding track record of over 20 EU-funded projects and actions as Leader or partner in related fields. Since 2001, the company acts as the National Editor of the EC Standard Eurobarometer public opinion. Since 2009, Militos acts as the exclusive media consultant of the EC Representation in Greece services mostly for events and awareness raising. In 2011 Militos was selected by the EC DG Enterprise and Industry to set up and operate the National Network for Business Mentors, as the local representative of the European Network of Mentors for Women Entrepreneurs (see Business Mentors at www.businessmentors.gr).
- **The European Centre for Women and Technology (ECWT) (www.womenandtechnology.eu)** is operated by around 100 key multi-stakeholder actors representing high-level expertise in women and technology development from business, the government, the academia and non-profit sector,

with the goal to measurably and significantly increase the number of girls and women in ICT and technology. ECWT motivates and supports girls and women to take the giant step to actively participate in people and technology interactions in every field of their daily life and work. The ECWT is the first of 10 Regional Centers operating, based on a common global framework, working towards ensuring women and men are fully engaged in the information society and knowledge based economy. The ECWT carries out its activities based on the customized global framework in guiding the work of the regional centres globally, through 5 implementation instruments: *Policy* and *actions, Research* and impact metrics, *Resources* and services development, *Dissemination* and communication, and *Context* and culture in 4 thematic focus areas: *Education, Workforce, Entrepreneurship* and *Leadership*. To date N-PoCs have been established in Belgium, Finland, Germany, Greece, Hungary, Italy, Norway, Poland, Romania, Spain, Switzerland and the Netherlands, while new N-PoCs are being launched in 2012 in Bulgaria, France, Portugal and Sweden. The ECWT enjoys the patronage of the EC DG INFSO and has played a key role in safeguarding the gender dimension of the European 'e-skills Week', supported by DG Enterprise and Industry in both 2010 and 2012.

- **ITEC INC. Company Continuous Vocational Training Centre (www.itec.edu/)** offers hands-on training courses for the ICT sector and consulting services for ICT and project management. It has now 23 years of experience in providing initial and continuous training to ICT professionals such as developers and administrators. It also provides user-level training for businesses and individuals and regularly receives national funding to offer IT courses to disadvantaged groups (women, unemployed). Since 2001, ITEC closely cooperates with Unisystems S.A., one of the biggest IT companies in Greece, offering, designing and implementing integrated high standard IT Solutions.
- **The Hellenic Professionals Informatics Society (www.hepis.gr)** is the network, that connects all the ICT Professionals in Greece and which aims at meeting the expectations of both professionals and scientists in the field of Information & Communications Technologies (ICT). HePIS' objective is the promotion of the development of its Members' professional and scientific interests, as well as the free exchange of their professional and scientific views within the context of a continual dialogue and the representation and defense of the interests of those professionals and scientists who are active in the fields of Informatics, Communications and New Technologies in Greece. HePIS is the only member of CEPIS (Council of European Professionals Informatics Societies) and IFIP (International Federation for Information Processing) in Greece, representing the country's ICT professionals and promoting their interests at a Global level. HePIS is the national point of European Centre for Women and Technology (ECWT) in Greece and a member of European Alliance for Innovation (EAI).
- **OLN Learning (www.oln.gr)** offers specialist training design services for face-to-face and online synchronous events (webinars/e-clinics) for flexible learning anytime, anywhere. Its main target groups include teachers and trainers for whom it designs and

delivers train-the-trainer courses; entrepreneurs for whom it designs skills and mentoring training; and working individuals who need to develop new skills and competencies required on the job. Basic advantages are personal contact, comfort and flexibility, as well as time saving during learning. OLN Learning participates in several EU co-funded projects as a vocational education and training expert.

THE EUROPEAN COMMISSION LIFELONG LEARNING PROGRAMME (2007-2013)[1]

As the flagship European Funding programme in the field of education and training, the Lifelong Learning Programme (LLP) enables individuals at all stages of their lives to pursue stimulating learning opportunities across Europe. It is an umbrella programme integrating various educational and training initiatives. LLP is divided in four sectorial sub programmes and four so called 'transversal' programmes. The Education, Audiovisual and Culture Agency Executive Agency (EACEA) is responsible for the management of certain parts of the Lifelong learning programme under supervision from its parent Directorate-General for Education and Culture (DG EAC).

STRUCTURE

The sectorial sub-programmes focus on different stages of education and training and continuing previous programmes:

- Comenius for schools
- Erasmus for higher education
- Leonardo da Vinci for vocational education and training
- Grundtvig for adult education

The transversal programmes aim to complement the sectorial sub-programmes and to ensure that they achieve the best results possible. They aim to promote European cooperation in fields covering two or more of the sub-programmes. In addition they seek to promote quality and transparency of Member States' education and training systems.

The Jean Monnet programme also falls under the LLP umbrella stimulating teaching, reflection and debate on the European integration process at higher education institutions.

Eurydice is an institutional network for gathering, monitoring, processing and circulating reliable and readily comparable information on education systems and policies throughout Europe.

LEONARDO DA VINCI ACTIONS ACCOMPANYING MEASURES

The 'ladybizIT': Women entrepreneurship on the verge of ICT project is being implemented under the Leonardo da Vinci 'Accompanying Measures' actions to promote the objectives and results of Leonardo da Vinci projects. It therefore covers communication activities, thematic monitoring of projects and dissemination and exploitation of project results, as for example:

1. http://eacea.ec.europa.eu/llp/index_en.php

- Information and communication activities to promote and improve the visibility of activities and results within each programme.
- Thematic monitoring of ongoing projects working on a similar theme, including organisation of exchange of experience meetings, publication of updated project compendia and more systematic assessment of project results in support of more effective dissemination and exploitation of the best results.
- Collection and provision of information on project results, including via the development of common databases.
- Support for dissemination and exploitation conferences and events bringing together projects and potential users within the sector concerned, with a particular emphasis on promoting the transfer and take-up of project results by new users and mainstreaming into education and training systems and practices.

The papers presented in this reader are falling under five categories, each of them addressing distinct aspects:

THE WORLDS OF LABOUR AND ENTREPRENEURSHIP: THE GENDER PERSPECTIVE

PASSING THE TORCH: MENTORING AND LEARNING IN WOMEN ENTREPRENEURSHIP

BEHAVIORAL ASPECTS IN ENTREPRENEURIAL REASONING

WOMEN ENTREPRENEURS AND ICT

WOMEN IN THE FIELDS OF SCIENCES AND TECHNOLOGY

W**e would like to sincerely thank all the people that submitted a paper for the purposes of the European Conference "More technologies? More women entrepreneurs!".** Their effort, and much more than this, their insights are really valuable in complementing the 'ladybizIT' project objectives. Scholars and experts from the academic, entrepreneurship and market communities are sharing with us and all interested parties their knowledge on the core issues addressed by this initiative, that is, women in ICT and entrepreneurship in the European realm.

The reader at hand is a concise collection of assorted writings addressing several aspects of the issue of women in technology and entrepreneurship in the European Union. This initiative evolved around the scope and the objectives of the European Commission co-funded project 'ladybizIT': Women entrepreneurship on the verge of ICT". The 'ladybizIT' project (2011-2012) is being implemented under the European Commission Lifelong Learning Programme (LLP, Leonardo da Vinci, Accompanying Measures).

THE PAPERS

THE WORLDS OF LABOUR AND ENTREPRENEURSHIP: THE GENDER PERSPECTIVE

Reflections on gender related issues, which come into play in the realms of entrepreneurship and the labour market in general, comprise the object of the first two papers.

Dr. Irene Kamberidou and Eva Fabry (Redefining professional success and concepts of excellence: Integrating a gender perspective) are stressing the issue of utilizing all human resources, showing that women are an economic force to be reckoned with for sustainable economic growth. Going for the utilization of the entire talent pool, rather than the waste of talent, the two scholars identify major gender gaps, arguing that integrating a gender perspective is valid to eliminate gender devaluation, eventually leading in women's contribution minimization.

Kyriakos Lingas (Family business and the gender of entrepreneurship) is exploiting the theoretical 'vagueness' and the conceptual dualisms in family business academic inquiry, as well as among the business community, providing symbolic properties, representations and practices, which reflect social attitudes - or the construction thereof - towards the 'division of labour' between men and women, when it comes to real life participation and action in the world of economy and entrepreneurship.

PASSING THE TORCH: MENTORING AND LEARNING IN WOMEN ENTREPRENEURSHIP

In their study, **Olga Stavropoulou and Dr. Sophia Protopapa** (A strengths-based approach to mentoring women entrepreneurs: How to free the strengths within them) are stressing

the importance and benefits of one promising and dynamic approach for any woman entrepreneur or wannabe entrepreneur, relying on her efforts to identify, understand and make proper use of her existing inner strengths in her business endeavors. To this end, a mentor is catalytic in facilitating her to recognise her strengths, with a focus on those that empower her business growth and at the same time manage to surface and exploit her untapped potential.

BEHAVIORAL ASPECTS IN ENTREPRENEURIAL REASONING

Dr. Ioannis Salamouris (How overconfidence influences entrerpreneurship), taking on a behavioristic aspect, delves into the issue of what makes individuals to pursue entrepreneurship, which engages too much risk for an unsure, or too little return. He goes on exploring the concept of overconfidence as occurring in entrepreneurial reasoning, providing insights on the impact thereof in actual entrepreneurial behavior.

WOMEN ENTREPRENEURS AND ICT

Under this topic, **Angelina Michaelidis Vassilakopoulou** (The contribution of technology in business growth, The case of Greek ladies) explores the overall image of the use of digital technology by Greek women. She stresses out the benefits of using all possible methodologies and tools, including digital media and social networks, in order for women entrepreneurs to break language, geographical and personal barriers and set up their own micro operations, that can respond to customer request in broad areas, or even globally.

Dr. Irene Kamberidou and Manolis Labovas (Social women share: technology as an enabler) discuss the concept of Social Media, using the social network perspective and present current research findings on social women, specifically the new models of work, levels of engagement, transformational leadership styles and in particular women entrepreneurs that have been de-mystifying the world of social media through the lens of their own experiences. This paper argues, that women enjoy a slight edge over their male counterparts and that today's business climate is more inviting for aspiring women entrepreneurs.

Taking on a different aspect, **Alexandra Michota (Ph.D. Candidate)** (Digital security concerns & threats facing women entrepreneurs) provides insights on the main concern that discourages women to enter dynamically into e-business market, which is the disclosure of their personal information compared with men who appear willing to sacrifice their privacy for the profits of electronic commerce.

WOMEN IN THE FIELDS OF SCIENCES AND TECHNOLOGY

The rates of women participation in the fields of Sciences and Technology has caused heated debates, as it is probably there, where women's potential is being overlooked and underestimated.

Dr. Stella Bezergianni (Conceiving, exploring & exploiting innovative ideas: From waste cooking oil to diesel) provides a brilliant example for conceiving, exploring and exploiting new ideas

as the basis for technological creativity and innovation. She shows, how an innovative technology was born and effectively implemented thanks to women scientific creativity by an enthusiastic research group led by a female engineer.

On the other hand, **Dr. Angeliki Dimitriadi** (Young women in science and technology, The importance of choice) deals with the underrepresentation of women in Science and Technology (SET) both in the academic field as well as in the private sector. She is going to show, that often Science is rejected by young women as a career choice due to limited information available and lack of positive role models to encourage young girls in participating.

In the same vein, **Matina Tsavli (Ph.D. Candidate), Dr. Spyros Kopsidas and Dr. Dionisis Vavougios** (Women engineers lack of precedence: The 'virgin territory' of robotics) document the exclusion of women from the productive and research process in robotics. They reach the conclusion, that existing stereotypes and biases with regard to gender have hatched and produced the behaviour of women and the way they are encountered and treated by the society.

Women in ICT and entrepreneurship is a topic that cross-cuts many complementary fields, be it from the world of academy, the market, entrepreneurship or policy making. People across all those fields took the time and the effort to bring in their own ideas and reflections on the issue. We hope that their input and aspects shed light from different directions, making this set of writings an interesting read.

Enjoy it!

THE WORLDS OF LABOUR AND ENTREPRENEURSHIP
THE GENDER PERSPECTIVE

REDEFINING PROFESSIONAL SUCCESS AND CONCEPTS OF EXCELLENCE
INTEGRATING A GENDER PERSPECTIVE

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ABSTRACT

Integrating a gender perspective means eliminating the wastage of talent— utilizing all human resources— and as a result boosting innovation, a prerequisite for economic growth and effective sustainable development. In the last decade studies confirm that companies, firms, organizations and institutions that recognise talent in any form and make good use of it show greater success rates with regard to profits and sustainability. Research shows that women are an economic force to be reckoned with for sustainable economic recovery. This does not mean that women are inherently more talented and better skilled than men. It does however indicate that companies that have utilized their entire talent pool and identified and promoted female talent into leadership roles, have a vital competitive advantage. Surveys also confirm that female-led ICT businesses and women-owned firms (women entrepreneurs) have been successfully competing in the global market, the latter using more high technology systems than their male counterparts. Despite gender mainstreaming policies, legislation and the recognition by many companies, organizations and institutions that diversity is essential, women are less satisfied with their careers as they still lag behind men in compensation and advancement. In examining the three major gender gaps— the leadership gap, the pay gap and the participation gap— this paper argues that integrating a gender perspective is vital in order to eliminate gender devaluation, namely the subtle processes by which women's contributions are minimized, undervalued or devalued in the so-called male professions. Integrating a gender perspective, a social, cultural and technical process, requires shifts not only in organisational practices, attitudes or ways of thinking, but also in resource allocations, goals and structures along with monitoring processes. This paper argues for an Alternative Model which entails: recruitment and politicizing the personal, namely "flexibility re-thought"

along with technology as an enabler, re-thinking and redefining the model for professional life, auditing compensation practices, identifying high-potential people and re-training returners. Specifically, gender diversity mainstreaming (integrating a gender perspective) in science, technology, engineering and math (STEM), research and development (R&D), the academia, product and service innovation, health action and services, innovation management and economic global competition, which is becoming increasingly tough, means redefining professional success and concepts of excellence. It requires setting up an all-encompassing European collaborative platform or hub of information that will encourage future debates and synergies for establishing measures and best practices at many levels, finding alternative paths to advancement and participation (eg. A holistic approach, flexible work, eliminating age barriers for men and women, rewarding social service), identifying the voice of the next generation, creating opportunities for visibility, testimonial sharing, generating insights on how to contribute effectively to organizational growth, formal mentoring programs for both women and men, ethnic minority groups, among other things.

Keywords: *Wastage-leakage of talent, gender devaluation, gender fatigue, tokenism, glass escalator, gender energy, renegotiating concepts of excellence/success*

GENDER INTEGRATION: "NO PLACE FOR MACHO NONSENSE IN OUR DIGITAL FUTURE"

On a global level there is a shortage of 1.2 million staff in the ICT sector! With regard to the European ICT sector, the Commission estimates that it will face a shortfall of 700,000 skilled workers by the year 2015, partly explained by a lack of women engineering and computing graduates. In addressing the gender deficit in ICT, Neelie Kroes, Commissioner of the Digital Agenda said "We need to tackle the problem early and from many angles", stressing that "Companies and governments need to do more than run networks and camps - the effort must range from better child care to a better balance of subjects in the school system [...] From classrooms to boardrooms to garage start-ups: my message is the same. There is no point in getting half of Europe digital. There is no place for macho nonsense in our digital future. Until the whole sector understands this and acts on it, we will remain at risk of a massive skills gap and we will hold Europe back."[1] One must also call attention to the alarming predictions that if there is no drastic change in the female employment rate, demographic developments in Europe indicate that by the year 2036 there will be a drop of 24 million in the active workforce[2]!

Accordingly one need point out that the European Centre for Women and Technology[3](ECWT) Position Paper and Report— from the Women

1. See: "Don't take no for an answer – Neelie Kroes addresses gender deficit in ICT" (07/03/2011), in Europe's Information Society Thematic Portal: http://ec.europa.eu/information_society/newsroom/cf/itemdetail.cfm?item_id=6786&utm_campaign=isp&utm_medium=rss&utm_source=newsroom&utm_content=tpa-9Eurostat 2005. Also see: Global Insight 2000-2030 McKinsey.
2. Global Insight 2000-2030 McKinsey.
3. www.womenandtechnology.eu

for Smart Growth workshop held at the First Digital Agenda Assembly[4], 16-17 June 2011 in Brussels— stress that "the minimum 50% of the success of delivering the Digital Agenda will depend on whether the European Commission will find ways and means of integrating a critical mass of women in Europe into the access, design, research, innovation, production and use of ICT during 2011-2020."[5] The ECWT has been persistently arguing that this integration process needs to be based on a holistic approach, ie. all Directorate Generals of the European Commission collaborating around a Gender Action Plan for the Digital Agenda.

Since its establishment in 2008 the ECWT— a multi-stakeholder based non-profit organization which by the end of 2011 has had on board over a hundred major public, private organizations, academia and NGOs—has been leading systematic and strategic work to promote and emphasize that "Getting more women into ICT and technology is today, especially in the times of global economic crisis, not just a question of social justice, but a question of economic necessity, growth and competitiveness."[6] In 2011 the ECWT— in connection with the Centenary International Women's Day Conference 'Women in Science, Innovation and Technology in the Digital Age', 7-8 March 2011, Budapest chaired by Vice President Neelie Kroes, Commissioner of the Digital Agenda— launched a Position Paper to initiate a European level dialogue with all key actors engaged in collaborations for measurably and significantly increasing the number of girls and women in ICT, innovation and technology. The consultation process will be rounded off in 2012 by an EU Parliamentary hearing and is expected to lead to adoption of a resolution.

The lack of talent in the ICT industry and the small minority of women entering the job market in this field is a disadvantage for all, given that diversity and inclusion drive societal development, productivity and social cohesion. Women in Europe are drastically underrepresented across the board in ICT – in the academia, in education, in training programmes, in industry and in high level careers in this sector—so we need to address the factors that act as obstacles to inclusion and ensure that the opportunities are open to women on equal terms with men. If not addressed resolutely, the shortage of ICT-oriented women will have a great impact on future generations. Consequently, Europe's young people must be re-socialized to view ICT as an appealing or viable career option and field of study.
Current research indicates the need to focus on innovative approaches to getting gender back onto the agenda: reproducing women's participation, recruitment, retention, advancement and agency. We need to work for greater incorporation and awareness for women in the world of technology, engineering and science.

4. Digital Agenda Assembly, http://ec.europa.eu/information_society/digital-agenda/daa/
5. Women for Smart Growth (2011). http://www.womenandtechnology.eu/digitalcity/news/w_newsheading.jsp?dom=AAABECDQ&hir=BAAFKWON&fmn=AAABDVVI&prt=AAABDUAV&men=AAABDVWG
6. ECWT Position Paper 2011 p.1

Integrating a gender perspective is vital as women face many obstacles in their careers. How do we know women face obstacles? Through research of course! (Fabry 2011, Fabry, Püchner, Sangiuliano 2011, Farrington 2011, Dr. Kamberidou 2010, Kelan 2010, Merriman 2010, Benschop & Brouns 2003, Hultin 2003) Despite the documented gendered barriers, it is also quite common nowadays to hear the view that equality of opportunity for women is no longer an issue. Could this be due to gender fatigue? Gender fatigue, a concept examined in the last part of this paper, refers to the loss of energy to acknowledge, oppose or tackle afresh something no longer perceived as a problem and as a result it reproduces and solidifies the gender devaluation processes. (Dr. Kamberidou 2011, 2010a)

Integrating a gender perspective is not a matter of adding one more variable to the equation of social justice but an issue of integrating diversity into the system—as opposed to wasting it. Integrating a gender perspective means eliminating the wastage of talent and as a result boosting innovation which is a prerequisite for effective sustainable development and economic growth. Innovation is uppermost in the mind of decision makers and policy makers all around Europe who have in recent years acknowledged this wastage of talent. It means strengthening performance, ie. giving businesses a competitive advantage, a much needed boost as global competition becomes increasingly tough. EU Heads of State and Government on 2 March 2012, stressed that one of the targets of Europe 2020, through the Innovation Union flagship is to boost innovation, research and development in Europe, a vital component of Europe's future competitiveness and growth. The Europe 2020 strategy is Europe's growth strategy. The conclusions of the European Council stress the need for more efforts to complete the European Research Area by 2014, as well as a number of other important advances that are necessary.[7]

Gender integration refers to the process of assessing the implications for both women and men of any planned action, including policies, legislation or programmes at all levels, in all social, economic and political spheres. In other words, integrating a gender perspective means recruiting more women, retaining them (eliminating the leaky pipeline), encouraging, supporting and re-training returners, those who had taken a career break and early retirees re-entering the workforce as well as advancement, namely promoting women into leadership roles. Concurrently gender mainstreaming (integration) goes beyond increasing women's participation. It means bringing the experience, knowledge and interests of both women and men to bear on the development agenda. Specifically identifying the need for changes in that agenda. It requires changes in goals, strategies, and actions so that both women and men can participate, influence and

7. "European Council confirms research and innovation as drivers of growth and jobs" (2 March 2012) http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/12/153&format=HTML&aged=0&language=EN&guiLanguage=en (retrieved 3/3/2012)

benefit from development processes. The goal of mainstreaming gender equality requires the transformation of unequal social and institutional structures into equal and just structures for both men and women.

WASTAGE AND LEAKAGE OF TALENT: DISAPPEARING WOMEN, A THREAT TO SUSTAINABILITY

In many countries around Europe an average of about 23% of women that graduate from technical universities do not apply for work and those that are working in the ICT sector eventually leave after a few years (leakage of talent or leaky pipeline), consequently adding to this global shortage of 1.2 million staff in the ICT sector as previously cited. Why do these professionals abandon their careers? What are the causes for this leakage of talent and gender participation gap? Primarily the gender-blind practices and policies that contribute to women's under-representation such as the gender pay gap, the gender leadership gap, the family-career imbalance, among other things. (Fabry 2011, Dr. Kamberidou 2011, Fabry, Püchner, Sangiuliano 2011)

For example, the "Women and ICT status Report 2009" (European Commission 2010) clearly shows that women across Europe earn about 17% less than men and in some countries the gender pay gap is widening even more, that is to say it increases as one gets older: the gender pay gap for young female engineers, scientists and technicians is 17% until the age of 35 and rises to 38% and 37% for the 45-54 and 55-64 age-groups respectively. As a result, women continue to leave the ICT sector in disproportionate numbers (leakage of talent). (Dr. Kamberidou 2010a) Additionally, the new e-skills report, Technology Insights 2011[8]: "the UK IT and telecoms industry needs more than 110,000 new recruits to just meet this year's demand."[9]

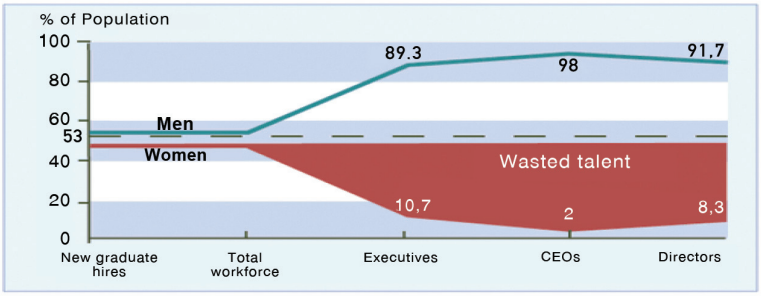
Karenza Griffith's (2010) "Disappearing Women" also confirms this shortage, wastage and leakage of talent in the ICT sector, that is to say the problem not only in attracting women into the sector (gender participation gap), but also in retaining them (leaky pipeline). In contrast to the majority of existing studies in this area that concentrate on women who remain in the ICT workplace, Griffith's Disappearing Women focuses on the women who left the UK ICT sector due to dissatisfaction with their work situations, in spite of having crossed the ICT recruitment barriers and amassed skills, expertise and qualifications. In this qualitative study professional women describe how they had been overlooked, effectively silenced and pushed out. Specifically, Griffith documents women's "disappearance" from the ICT sector through nine in-depth qualitative autobiographical interviews as well as using supporting studies and data such as those of the Department of Trade

8. Which is the sector skills council for business and information technologies report: "The UK tech industry needs 110,000 new recruits, says e-skills". ComputerWorld UK, the Voice of IT Managment. Published: 18 January 11, 12:30 GMT (http://www.computerworlduk.com/news/careers/3257145/uk-tech-industry-needs-110000-new-recruits-says-e-skills/
9. Ibid.

and Industry (DTI). The results of this qualitative study show that the number of women in the ICT sector has remained disappointingly small, even though women make up around 50% of the total UK workforce. "The whole IT profession needs to work together to create a pipeline of future female talent for the industry but we also need to focus on encouraging the women who are already working in the industry to stay and succeed." (Griffith 2010)

The IT industry's lack of gender diversity practices is also confirmed in the UK's Higher Education Careers Services Unit (HECSU) report, according to which another cause for concern is the ageing workforce: the proportion of IT and telecoms professionals aged under 30 has declined from 33 percent in 2001 to just 19 percent in 2010, the sector favouring experienced workers over new graduates. (Nguyen 2010)

Despite legislation and gender mainstreaming policies, the recognition by many companies, organizations and institutions that diversity is essential, many studies show that women are less satisfied with their careers than men and abandon them since they lag behind men in compensation and advancement. Women are consistently overlooked in decision making positions in the ICT sector, in the business sector, in S&R, in the academia, on research committees, etc (Fabry et al., 2011, Farrington 2011, Dr. Kamberidou 2010c, Kelan 2010, Merriman 2010, Fabry 2010, Benschop & Brouns 2003, Hultin 2003)



Source: The CEW CEO Kit edition 2. EOWA Australian Census of Women in Leadership 2008

In the global business sector this leadership gender gap seems to be widening, despite the fact that research— in the business sector in Europe and the US— shows that companies with women in leadership positions are more successful in regard to return on sales, equity and invested capital.[10] In the top European companies, from 2004-2008, women's participation in decision making positions has hardly risen. The number of women on the boards

10. Women Leaders and Resilience: Perspectives from the C-suite, Accenture 2010. (http://newsroom.accenture.com/news/resilience+key+to+keeping+your+job+accenture+research+finds.htm)

of European companies in 2004 was 8% and in 2008 it slightly increased to 8.5%, with the exception of the Scandinavian countries. (Fabry 2011, European Commission 2010, CEW 2009)

The leadership gender gap is also observed in Australian companies. For example, the percentage of women CEOs increased slightly between 1994 and 2008, a period of record economic growth for Australia. The percentage of women CEOs increased from 8% in 1994 to only 10.7% in 2008. Moreover, in 2008 women on boards represent only 8.3% (CEW 2009:5). Alarming as well is the decrease in the percentage of female directors. In 2004, 50.3% companies had at least one female director (something we can perceive as a token[11]), whereas in 2008 this percentage decreased to 49%, less than it was in 2004! This underrepresentation is not an issue of women's workforce participation or education level, since women make up around half of all workforce entrants and are graduating in equal or even greater numbers to men in faculties of economics, commerce, business and law. Women also lag behind men in Australian companies when it comes to remuneration (gender pay gap). Despite equal pay legislation passed 50 years ago, female executives still earn considerably less than their male counterparts. An analysis of remuneration in company annual reports shows that the overall median pay for women executives is only 58% of the median pay for men. The gender pay gap persists in 9 out of 10 industries and is greatest in the financial services. (CEW 2009: 4-9)

The "Stupid Curve" (Wasted talent) describes the failure of companies and organizations to recognize and promote women as leaders, consequently missing out on a significant and measurable competitive advantage. This term ("Stupid Curve")—a phrase coined by former Deloitte USA Chairman Mike Cook— is used to emphasize the wastage of internal talent in Australian companies in a report released by Chief Executive Women (CEW), February 2009, according to which Australian organisations select 90% of their leaders from only 50% of their workforce (the male half). Consequently, the other 50% (the female half) of the workforce is overlooked, underutilised and devalued. Although men and women enter the workforce in about equal numbers, men have a nine times better chance of reaching the executive level. (CEW 2009)

What a wastage of talent, as many studies confirm that companies with over 30% women at the top perform better,[12] that women have different leadership behaviours and practices than men,[13] among other things. The integration of a gender perspective is vital today due

11. Tokens are usually women, ethnic minorities, the aged or individuals with special needs who are often treated as symbols or representatives of a marginal social group.
12. Women matter: gender diversity, a corporate performance driver, January 19, 2012 By Curt Rice, http://curt-rice.com/2012/01/19/women-matter-gender-diversity-a-corporate-performance-driver/ (retrieved 21/2/2012).
13. Women matter 2: female leadership, a competitive edge for the future, January 23, 2012 By Curt Rice http://curt-rice.com/2012/01/23/women-matter-2-female-leadership-a-competitive-edge-for-the-future/ (retrieved 21/2/2012).

to the ongoing gender devaluation processes, namely the subtle processes by which women's contributions are minimized, undervalued or devalued, (Benschop & Brouns 2003, Farrington 2011, Dr. Kamberidou 2011). This gender devaluation and wastage of human resources is also observed in European universities and in the media hierarchies. In the 27 countries of the European Union, even though 59% of university graduates are women, only 18% of full professors are women, and only 9% of universities have a women at the top of the organisation.[14] Women are also underrepresented in executive levels of the mass media. A survey conducted by the Global Media Monitoring Program in 2010 shows that women lag behind men in professional categories as media authorities, newsmakers, experts and spokespersons. Women barely feature in news stories and make up only 19% of spokespersons and 20% of experts. In contrast, 81% of spokespersons and 80% of experts in the news are male.[15]

Another study followed the career progress of 4,143 women and men with MBA's from leading business schools in Europe, the United States, Asia and Canada who were working full-time in companies and firms. (Carter and Silva 2010) According to the results, men were twice as likely as women to be at the CEO/senior executive level and women lagged behind men in compensation and advancement and were less satisfied with their careers than men. Career path profiles were created for the 4,143 women and men from the data and findings gathered from an online survey of 9,927 alumni who graduated between 1996 and 2007 from MBA programs at 26 leading business schools, working full-time in companies and firms at the time of the survey (2007-2008). The study compared job placement opportunities, career advancement, remuneration (the gender pay gaps) and job satisfaction. According to the results here too the promise of the pipeline for women into senior leadership was found to be lacking. In other words, women faced the same problems in career advancement: the glass ceiling and the leaky pipeline.

Women's under-representation or wastage of talent is also observed in entrepreneurship. Women constitute only 34.4% of the EU's self-employed workforce and only 39.4% women choose to be self-employed compared to 50.2% men.[16] Utilizing the entire talent pool is essential in this sector as well in order to generate and stimulate economic growth, especially since many surveys confirm that female-led ICT businesses as well as women-owned firms have been successfully competing in the global market.

14. See the European Commission's: "She Figures 2009 Statistics and Indicators on Gender Equality in Science" in: http://ec.europa.eu/research/science-society/document_library/pdf_06/she_figures_2009_en.pdf (retrieved 21/2/2012).
15. According to Valérie Tandeau de Marsac, founder and President of voxfemina (http://voxfemina.asso.fr)--a French non-profit organization created to enhance the visibility of female experts in the media— in an interview in the February edition of the ECWT Newletter.
16. "Women Entrepreneurs encouraged to take the plunge", 08/12/2010, in: http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/1675&format=HTML&aged=0&language=EN&guiLanguage=en

ENTREPRENEURS: THE FEMALE AND MIGRANT TALENT POOL

"Of our 8,000 partners worldwide, 15% are women. We are white males—that's where we come from. Our objective is not 50/50. It's the best people. But that is closer to 50/50 than it is to 85/15"[17] (Samuel DiPiazza, Jr, CEO, Pricewaterhouse Coopers)

Surveys conducted by the National Foundation of Women Business Owners (NFWBO) show that women-owned firms compete in the global market, stimulate growth and are focused on business expansion.[18] Women entrepreneurs have a significant impact on the economy, not only in their ability to create jobs for themselves but also in creating jobs for others.[19] Women entrepreneurs are highly educated and use more high technology systems than their male counterparts. However, they constitute, as previously mentioned, only 34.4% of the EU's self-employed workforce and only 39.4% women choose to be self-employed compared to 50.2% men.[20] Women also create smaller but relatively more viable enterprises, are more cautious than men and possess better awareness regarding the risk of failure.[21] Consequently, it is vital for more women to learn how to play the international trade game and to raise the visibility of women's entrepreneurship. A global network of women's business associations as well as information technologies could help in many ways to encourage women to launch their own businesses, identify markets, provide industry information and spotlight trends on the role of women in sustainable economic recovery. (Dr. Kamberidou 2010b)

In order to foster growth and jobs in Europe, making the most of Europe's potential, we also need to support another important pool of entrepreneurs, that of migrants and people from diverse ethnic minorities. Statistics show that proportionately more migrants and members of ethnic minorities than nationals start small businesses! The Commission and Member States have been supporting and promoting migrant and ethnic minority entrepreneurs, helping them overcome difficulties that prevent them from starting businesses in Europe. Undeniably they have accomplished a lot in dealing with problems of deliberate discrimination. However there is still

17. In: Why Women Mean Business (2009) by Avivah Wittenberg-Cox & Alison Maitland. Wiley: John Whiley & Sons, Ltd. Publication.
18. See: International Entrepreneurship in: http://www.internationalentrepreneurship.com/european_entrepreneurship/greece_entrepreneur.asp (retrieved 12/2/2012)
19. "Women Entrepreneurs encouraged to take the plunge", 08/12/2010, in: http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/1675&format=HTML&aged=0&language=EN&guiLanguage=en
20. Ibid. Also see figures in: "Women Entrepreneurs encouraged to take the plunge", 08/12/2010 http://ec.europa.eu/enterprise/newsroom/cf/itemlongdetail.cfm?displayType=news&lang=el&tpa_id=1020&item_id=4772&tk= (retrieved 26/2/2012).
21. Ibid.
22. See: Migrant and ethnic minority entrepreneurs - reference documents 2008 Conference "Migrant Entrepreneurship/ Ethnic Minority Entrepreneurship - Diversity in a united Europe", article "Entrepreneurial Diversity in a Unified Europe, 05/03/2008 @ Brussels, Belgium, in: http://ec.europa.eu/enterprise/newsroom/cf/itemlongdetail.cfm?item_id=3294 (retrieved 12/2/2012)

a need to raise awareness amongst the different stakeholders and establish measures at many levels of government.[22] Many problems migrant/ethnic entrepreneurs confront do not differ from those confronted by women or native speakers, however the additional difficulties that appear to primarily affect this pool of entrepreneurs are: language barriers, social discrimination and prejudices (such as racism and xenophobia), access to financing and to support services, limited business, management and marketing skills, over-concentration in low entry threshold activities with limited scope for diversification into mainstream markets and so forth. In this framework, as previously cited, the ECWT has been systematically working to increase women's participation and emphasizing that "Getting more women into ICT and technology is today, especially in the times of global economic crisis, not just a question of social justice, but a question of economic necessity, growth and competitiveness." [23]

Finally a further dimension of the gender diversity agenda is dealing with problems of deliberate discrimination faced by migrant and ethnic minorities, where there is still a need to raise awareness amongst the different stakeholders and establish measures at many levels of government.[24] Utilizing or taking advantage of the entire talent pool—migrant/ethnic social groups and women— can provide an important competitive advantage since many studies confirm that companies that recognise talent in any form and make good use of it have greater success rates. For example, a 2008 McKinsey & Company study shows that companies with the most gender diverse management teams have on an average higher business results, greater success with regard to profits and sustainability.

Another study carried out by the Technology & Social Change Group (TASCHA) with the support of Microsoft about Immigrant women, e-skills and employability in Europe (Garrido 2010) suggests that strengthening e-skills among immigrant women is an important factor for improving women's position in the labor market. This study also confirms that NGOs play a pivotal role in fostering social, economic and cultural integration and in promoting many of the competencies identified by the European Union as critical to succeed in today's labor market.

GENDER FATIGUE

"Younger women find it difficult to connect to women's networks in the workplace, because they view these networks as something that belonged to their mother's generation." (Merriman 2009)

A recent study blames "gender fatigue" (Kelan 2010) for the failure of companies and organization to increase the number of women reaching executive ranks. Gender fatigue refers to the loss of energy to acknowledge and oppose gender discrimination, including the lack of interest to tackle afresh something no longer perceived as a problem. It refers to the

23. ECWT Position Paper 2011 p.1

24. See: Migrant and ethnic minority entrepreneurs - reference documents 2008 Conference "Migrant Entrepreneurship/ Ethnic Minority Entrepreneurship - Diversity in a united Europe", article "Entrepreneurial Diversity in a Unified Europe, 05/03/2008 @ Brussels, Belgium, in: http://ec.europa.eu/enterprise/newsroom/cf/itemlongdetail.cfm?item_id=3294 (retrieved 12/2/2012)

individual's feelings of weariness or of being too drained out to discuss gender discrimination and social bias. (Dr. Kamberidou 2010c). Gender fatigue, especially observed in younger women, refers to the lack of energy to repeatedly reconstruct the workplace as gender neutral, despite the fact that discrimination continues to exist.

Elisabeth Kelan (2010) argues that if you talk to people today in the workplace they construct the workplace as gender neutral. They assume that gender no longer matters because the issue has long been solved. Kelan calls this phenomenon gender fatigue. A qualitative study conducted, prior to the publication of her book, in two large organisations/companies in Information Communication Technology (ICT) in Switzerland—that promote themselves as having leading-edge policies and programs for gender equality— reveals that many of their female employees experience gender fatigue. Specifically, Kelan conducted job-based observations of 16 female employees as wells as 26 qualitative in-depth interviews with the staff— 16 men and 10 women. The age range of the participants was 25 to 54, the majority of which were in their late thirties. The ICT sector was chosen for this study because it is commonly perceived as an egalitarian and gender neutral sector, namely a true meritocracy sector where gender should not matter. One need point out, however, that this is also a sector which is male dominated and where there is a 25% gender pay gap, despite the fact that on a global level there is a shortage of 1.2 million staff in the ICT sector.[25]

In this study Kelan (2010) examines the ways in which employees navigated the dilemma of simultaneously acknowledging gender discrimination in the workplace whilst holding the view that their workplace is gender neutral. Most of the participants were reluctant to even talk about gender, an attitude which could lead to totally dismissing the relevance of gender in the workplace, in other words stabilize/ solidifying women's underrepresentation. As observed in the study, younger women in particular are the ones who experience gender fatigue since they confront more subtle gender bias in the workplace, which is much harder to deal with, especially since younger women are not active or engaged in discussions in women's networks or forums. In an interview to Reuters Kelan argues that: "Younger women find it difficult to connect to women's networks in the workplace, because they view these networks as something that belonged to their mother's generation." (Merriman 2009) Although companies have been taking measures to eliminate gender discrimination by appointing diversity officers and running diversity programs— that are seen by many people in the workplace as helping to ensure equality—women are usually excluded from the networking and client work in the workplace.

GLASS ESCALATOR

On the other when men enter female dominated professions—social work, librarianship, nursing and elementary education, etc. — they do not experience gender fatigue. They are not excluded from the networking and client work

25. Eurostat 2005, Global Insight 2000-2030 McKinsey.

in the workplace. They do not experience the gender pay gap or the gender leadership gap. They do not confront invisible obstacles such as the glass ceiling, the sticky floor or the leaky pipeline, but instead they experience positive discrimination.

They ride up—on what sociologist Christine Williams (1992:296) was the first to call the "glass escalator".[26] In other words underrepresented men are welcomed into the so-called female professions and workplace. They are encouraged, supported, retained, receive higher salaries and are promoted up the ladder, into the managerial ranks, more frequently and much faster than their female counterparts, and not only! They are overrepresented in the upper hierarchies! (Kamberdiou 2010c, Kimmel 2004, Hultin 2003, Williams 1992). Undeniably, as Hultin (2003) argues, the glass escalator has been taking underrepresented men on an upwardly mobile internal career path at a speed that their female colleagues can hardly enjoy.

Men who enter so-called women's professions/workplaces and women who enter the so-called men's professions also experience "tokenism" (Kimmel 2004:198-199). In both cases women and men experience tokenism, however their experiences as tokens are quite different. Research reveals strikingly different experiences when women are tokens in male dominated workplaces and when men are tokens in predominantly female workplaces. (Kimmel 2004, Williams 1992, Kanter 1977) Tokens are people who are hired or accepted into an organization, an institution or a company because of their minority status. Tokens are usually women, ethnic minorities, the aged or individuals with special needs who are often treated as symbols or representatives of a marginal social group. Inevitably this focus on difference, as opposed to respect for diversity, reproduces workplace inequalities, social stereotypes and the gender order.

This is not the case when women enter male dominated professions, as confirmed by the figures previously cited in this paper. Women do not ride up the glass escalator, since women continue to be exceedingly underrepresented, and especially in decision making positions in the ICT sector, in research, engineering, science and technology (S&T) and so forth. The invisible obstacles –glass ceiling, sticky floor— that prevent women from getting on the glass escalator (moving up the ladder) indicate that gender devaluation processes are consistently being reproduced. This is the case in the academia as well, as many findings confirm that women's interest in an academic career has been steadily decreasing due to the gender-blind academic structures and policies that devalue their services! (Farrington, 2011; European Commission 2010, Kamberdiou 2010c; Dr. Kamberidou 2008, Vlahoutsikou & Abatzi, 2007, Vosniadou 2004; Benschop & Brouns 2003)

26. Following interviews with seventy-six men and twenty-three women in four professions considered "female fields": social work, librarianship, nursing and elementary education

WOMEN FRIENDLY MEANS PEOPLE FRIENDLY: CONCLUDING REMARKS - RECOMMENDATIONS

How can we move from gender devaluation and gender fatigue to gender energy and get more women to ride up the glass escalator? Integrating a gender perspective, getting more women on the glass escalator, requires "getting gender back on the agenda" (Dr. Kamberidou 2010c). It means redefining professional success, finding alternate paths to participation and advancement as opposed to the linear-traditional male model in which the professional is focused on a career full-time, with few family duties (the male model), thereby preserving male stereotypes and making it difficult for individual men to break out. For instance, an obstacle women constantly confront is that of being a parent. Many studies confirm that in evaluations mothers[27] are usually penalised for having children while fathers are rewarded.[28] Integrating a gender perspective means acknowledging that "Women friendly means people friendly" (Cox & Maitland 2009: 281), namely improving the quality of the workplace for everyone. It means re-thinking and redefining the model for professional life—changing mindsets and stereotypes— that allows both men and women to flourish as individuals and professionals. How can this be achieved? We already have all the necessary research and analyses so what we need to do now is act. In order to accomplish this, initially we need to integrate a holistic approach, the human dimension into the equation, specifically to politicize the personal, which is largely ignored as a strategy relevant for reforms. One need reiterate here that the European Centre for Women and Technology (ECWT) has persistently argued that this integration process needs to be based on a holistic approach, which includes all Directorate Generals of the European Commission collaborating around a Gender Action Plan for the Digital Agenda. Both the ECWT Position Paper and Report from the Women for Smart Growth workshop held at the First Digital Agenda Assembly[29], 16-17 June 2011 in Brussels stress, that "the minimum 50% of the success of delivering the Digital Agenda will depend on whether the European Commission will find ways and means of integrating a critical mass of women in Europe into the access, design, research, innovation, production and use of ICT during 2011-2020"[30].

POLITICIZING THE PERSONAL

1. Recognize that gender balance is not exclusively a women's issue. The establishment or institutionalization of specific policies and funding for professional support and survival services in companies, organizations, firms and universities, such as family-life balance

27. Thoughts on university leadership. The motherhood penalty: It's not children that slow mothers down December 2011 By Curt Rice http://curt-rice.com/2011/12/08/the-motherhood-penalty-its-not-children-that-slow-mothers-down/
28. Thoughts on university leadership. The fatherhood bonus: Have a child and advance your career December 14, 2011 By Curt Rice, in: http://curt-rice.com/2011/12/14/the-fatherhood-bonus-have-a-child-and-advance-your-career/ (retrieved 21/2/2012).
29. Digital Agenda Assembly, http://ec.europa.eu/information_society/digital-agenda/daa/
30. Women for Smart Growth (2011). http://www.womenandtechnology.eu/digitalcity/news/w_newsheading.jsp?dom=AAABECDQ&hir=BAAFKWON&fmn=AAABDVVI&prt=AAABDUAV&men=AAABDVWG

programs: a) Formal career spousal/partner hiring policies, since many findings reveal that women who are professionals frequently have husbands or partners who are professionals, b) sharing parental leave (not only maternal leave), c) institutional day care, d) with regard to universities longer tenure tracks for both men and women, e) ensuring that the legal mechanisms are in place and that they actually work—accountability and penalties— since studies (Benschop and Brouns 2003) show that although such policies do exist, they are usually ignored.

2. Flexibility rethought - technology as an enabler. In response to changing social attitudes, flexibility needs to be made a priority tool for attracting and retaining both male and female employees. Men must also be encouraged to be role models for flexible working. Flexi-programmes are usually associated with low commitment and perceived as a benefit for women with children. The demand for greater flexibility today is not only about motherhood. One need point out that teleworking— working at home using a computer and phone— is most common among highly skilled, senior-ranking men. (Cox & Maitland 2009) Not only women want more flexibility in relation to work today. New models of work are emerging due to globalization, changing demographics and social attitudes. For example, parenthood is a role that men are increasingly sharing. The concept of retirement is dying as older people work beyond retirement age and young people are taking time off to travel, study, work for non-profit organisations, do volunteer work, etc. In other words, recognizing that careers are no longer linear and unbroken is also essential. Assisted by technology, highly skilled people today are using technology as an enabler—working independently, monitoring results instead of hours and balancing their personal-family/career lives, which the traditional model or the long-hours tied down to a desk model does not permit.

Integrating a gender perspective means banning discrimination (including unconscious bias or forms of discrimination). For example, the results of research on the evaluation of men and women applicants for postdoctoral positions in Sweden show that a woman is required to have 2.5 times as many publications as a man to be judged as equally qualified.[31] Integrating a gender perspective means identifying and eliminating systemic bias from the academia, corporate structures, firms, career management systems and processes. It means looking at the data on recruitment, promotions and remuneration. Specifically, it requires the following steps:

RECRUITMENT, REMUNERATION AND PROMOTION/ADVANCEMENT

3. Recruitment, vital for closing the gender participation gap. Accordingly it is necessary to first know the facts, to initially examine: a) if recruitment campaigns are effective in attracting women, b) where and how jobs are

31. See article: "Equality targets as a leadership tool", November 8, 2011 By Curt Rice, in; http://curt-rice.com/2011/11/08/equality-targets-as-a-leadership-tool/ (retrieved 21/2/2012).

advertised, c) what images are used to convey the corporate/organizational/workplace cultures, d) What is the situation in your organization, company or institution?, e) How does your organization/company/institution/industry compare to its competitors in the same sector?

4. Increasing gender balance so as to improve the quality of the workplace for everyone as well as making diversity an integral part of leadership development programs. Make diversity a priority by getting the leadership of your organization/company/institution/industry on board.
5. Auditing compensation practices, trends and policies to uncover hidden or subtle forms of discrimination or gender devaluation processes which lead to gender fatigue, so as to eventually eliminate the gender pay gap and leadership gap.
6. Identify high-potential people. Integrating a gender perspective means a) examining if companies have a structured programme to identify high-potential female and male employees or motivated individuals and invest in them, b) creating the necessary support structures around them to eliminate structural barriers, such as motherhood penalties, age penalties and the subjectivity of peer evaluations. One need point out here that when the age is capped (typically 28-35), it discriminates against child-bearing women as well as older adults. Scandinavian companies have removed the age limit altogether and 'progressive' companies have raised it to 40-45. (Cox & Maitland 2009)'

MENTORING PROGRAMS

Having more women and minority/ethnic groups in top positions, although crucial, is not enough to raise awareness, to change the way we think about gender, race and knowledge production. Men also need to change and this could be accomplished with their participation in Mentoring programs for women.

7. Compulsory participation of both male and female executives and faculty members of all ranks in formal mentoring programs. This requires a) the formulation of specific guidelines on what the Mentor should do for the female mentee b) training programs for Mentors— training the trainers, educating the educators—so that they acquire the skills and know-how to discuss overt discrimination (including sexual harassment), subtle institutional and cultural forms of discrimination, social biases, and so forth. This could contribute to their sensitization, to eventually reducing or eliminating male stereotypes (the male model) of success or excellence.

A EUROPEAN COLLABORATIVE PLATFORM OR HUB OF INFORMATION

The European Center for Women and Technology (ECWT) is continuing its discussions with interested stakeholders around the process of integrating a gender perspective into the workplace which could be facilitated by the establishment of an all encompassing European collaborative platform or hub of information, a version 2 of the European Directory of women and ICT developed during 2009-2010 with the support of DG INFSO[32] — for thinking globally

32. http://www.ictwomendirectory.eu

and acting locally— for identifying diverse stakeholders with a gender perspective, promoting intergenerational collaborations and networking with those who are at the forefront of implementing change, progressive thinking peers, universities, experts and the media. This could ensure that information and support services for women and minority groups are mainstreamed throughout the system to diverse stakeholders. Such a collaborative platform and forum for closing the gender gaps in Europe could promote:

8. The initial identification of issues and problems across all areas of activity.
9. A gender-sensitive multi-stakeholders checklist or tool kit, etc.
10. A regional mapping for setting baseline indicators and accountability mechanisms for monitoring progress.
11. The concept of gender integration/mainstreaming into practice: allocation of adequate resources, equitable participation at all levels of decision-making, women-specific policies and programmes, etc.
12. Partnerships and collaborations focused on eliminating the three major gender gaps in Europe: participation gap, pay gap, leadership gap.
13. Successful lobbying practices, alternative models, examine the effectiveness of existing legal or formal mechanisms in protecting women and ethnic minority groups, accountability processes, etc. 14. Projects for getting more girls to choose and to stay in science, technology, engineering and math (STEM) as well as continuous impact measurement.

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FAMILY BUSINESSES AND THE GENDER OF ENTREPRENEURSHIP

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ABSTRACT

Economy, business and entrepreneurship are closely related to the worlds of men. Home, nurturing and the family belong to women's world, so the story goes. On the other hand, family entrepreneurship and its outcome, the family business, is probably the most traditional way of conducting business all over the globe and throughout history, constituting a dominant part of the world economies, being thus a universal phenomenon. However, in comparison to other economic and entrepreneurial activities, the field of family entrepreneurship has been only recently addressed by economists, researchers and academics in general. Family entrepreneurship as a field of inquiry is suffering the consequences of conceptual dualisms and stereotypes rendering 'family' and 'business', 'kinship' and 'economy', 'private' and 'public' as distinct spheres of social and economic conduct. To that extent, the topic lies at the 'grey zones' of scholarly inquiry, resisting clear-cut definitions and approaches. In this paper, we will explore the nature of these ambiguities in theorizing family entrepreneurship, trying to exploit their 'plus' side, this is, considering the theoretical 'vagueness' of the organizational pattern of family businesses as an excellent opportunity and a perfect tool providing valuable insights on the engendered character of the concepts of 'business', 'entrepreneurship', 'family' and 'economy'. Based on studies addressing the issues of succession, participation and exclusion of women in family businesses, we will explore representations and practices, which reflect social attitudes - or the construction thereof - towards the 'division of labour' between men and women, when it comes to real life participation and action in the world of economy and entrepreneurship.

Keywords: *Family business, entrepreneurship, gender*

INTRODUCTION

It is safe to say, that the majority of companies and enterprises around the globe can be more or less defined as family firms. Defining family firms is an adventurous endeavor itself. As for now, there is no consensual definition available. For the purpose of this paper, it should be taken under consideration, that whenever referring to the form of family firm, it is meant to be an enterprise/business/company involving one or more families or family members in management and control, as well as in day-in-day-out procedures. Although family firms are probably the most traditional way of conducting business not only in recent times,

but throughout history, the studies of family business and family entrepreneurship in general have only recently gained the status of a distinct academic field. This paper will briefly explore the underlying reasons for the under representation of family entrepreneurship and family business in mainstream academia and scholarly theorizing, employing mainly the perspective of the concept of 'gender', to highlight dualisms and stereotypes rendering 'family' and 'business', 'kinship' and 'economy', 'private' and 'public' as distinct fields of social and economic conduct, constructed around symbolic forms.

First, we will provide an outline of theoretical aspects, which were crucial in the formation of family business studies, accompanied by an approach based mainly on the analytic potential of the concept of gender, as well as on studies and insights addressing among other things the issues of succession, participation and exclusion in the organizational pattern of family firms. In turn, sets of representations, practices and social attitudes towards the engendered 'division of labour' in the world of entrepreneurial action will be summed up.

THE EVOLUTION OF FAMILY BUSINESS STUDIES: THE EPISTEMOLOGICAL CONTEXT

The purpose of this overview is to look into the ways by which family business studies have been shaped, in an effort to trace the genealogy of notions and connotations accompanying family firms throughout time, both within the confines of academia, as well as within the business community itself. At this point, it has to be noted, that this overview is being based on the evolution of educational and research programs clearly addressing family firms in the last 50 years mainly in the USA and Europe, which is an enormous task by itself. Therefore, it is stressed out, that there are certain limitations in fully capturing the evolutionary chart of family business studies, as well as in presenting cross-cultural aspects for the issue at hand, which would be highly welcomed, but on the other hand surpasses the scope and the space limits of this study.

During the pioneering efforts in studying the business model of the family firm in the first two post-war decades (the 1950s and 1960s) family businesses were connected with mostly negative connotations. The one was nepotism, referring mainly to the practices of promoting kinship relations and inter-family connections at the expense of merit and personal achievements or skills to be found outside the family circles in family business management, control and succession models. The next more important negative connotations on which this paper attempts to focus on, stem from deeply rooted stereotypes, which render the space of 'public' and in particular the fields of economy, economic action and market as a masculine arena, opposed to the space of 'private' as a feminine arena of emotions and affective behavior, nurturing and domesticity. Thus, in terms of educational progress in the fields of management and business, the 'family' variable - the 'soft', 'emotion-laden', 'feminine' factor - in the organizational form of family firms was either non-existent (Dyer 2003), or the one to be tamed and kept isolated, in an effort to avoid entering into 'real-world' decision-making, which shouldn't be intruded or even disrupted by 'femininity' and emotions.

These attitudes towards family firms are the product of a vicious circle of conceptualizations and generalizations, which go deep into cultural assumptions about the division of the social realm in terms of 'public' and 'private' domains, symbolically affiliated with masculinity and femininity respectively. The family, therefore, seems to serve as a refuge from the antagonistic arena of markets, economies and work, as well as a unit of reproduction both in biological terms and in terms of reintroducing those dualisms.

Under the light of these considerations, it is of no big surprise, that during that period, the aforementioned notions and connotations marking the organizational pattern of family firms, were fed up into and reflected by institutional actors of the caliber of the 'United Nations' declaring that:

"...Where the family firm does play an important part in business, it is often a reflection of the economic immaturity of the population, the absence of a tradition of impersonal service in industry and the unreliability of employees who have no kinship ties to the firm. Industrial development cannot but be handicapped by inappropriate standards of economic reality". (United Nations 1955:20 in Burton 1968)

Among those lines, one could easily acknowledge the main theoretical axioms of mainstream economics, echoing the voices of the discipline's founders almost two centuries ago, according to which individuals exchange, sell and buy as a result of an innate propensity to do so. In the evolutionary course of this procedure, people created markets, institutions and exchange media to support social life and facilitate the functioning of the whole system, which in turn was based around this cosmological pattern. Following personal interest and rational calculation of means and ends, individuals as maximizers of benefit engage in practices which are determined by the rules of markets, while other qualities of psychological, emotional, cultural nature involved in economic action are considered as non-relevant. Although these assumptions have been questioned and criticized from within the discipline of economics itself, they still are with us. Moreover, at the time, these assumptions were also prevalent in social theory in general, that is, mainly the Parsonian model of modern society based on the dichotomy of instrumental vs affective, which in turn drives us back to the Weberian concepts of economic versus other social action, carrying eventually the symbolic properties of 'female' versus 'male' (Weber 1964; Yanagisako 2002). At the same time, Management and business studies – at least in the United States where they were blooming – have been heavily affected by these core assumptions in theorizing economy and economic action.

Summing up the dominant paradigm in approaching and theorizing the phenomenon of family firms, it is clear, that it is classified along a conceptual schema, which pervades academic, educational and business communities, positioning family business in the 'grey' zones between emotion and reason, female and male, individual and social/collective/cultural and eventually humanities and sciences (Jones 2005). This ambivalent stance in the formative years of family business studies has had by and large 'short-circuiting' the basic premises on which relevant theory and methodology were built.

By the end of the 1960s and moreover during the 1970s, social sciences have been swept by theories building up around the concept of 'gender'. This was the result of social and political unrest characterizing Western societies at the time, leading to the emergence of the feminist project. The male-centered paradigm across social theorizing has been seriously challenged, while academic inquiry and focus moved from taken-for-granted assumptions about 'sex' to the various cultural attributes assigned each time by society to the masculine and feminine. Later on, the concept of gender refined relevant theories, pushing up front the issue of the cultural construction of these theoretical categories, as well as the various models of female subordination and subsequent power relations patterns lurking behind the so far unquestioned dichotomies (Encyclopedia of Social and Cultural Anthropology 1996).

During this period, research, training and consultancy on family business issues took off, by providing training programs for family firm owners drawing mainly from the fields of law, psychology, accounting and management. At the same time, the need for an interdisciplinary approach has been widely acknowledged. In the upcoming years, the scope of family business studies has been expanded stressing the socioeconomic importance of family firms, assessing the historical development of family entrepreneurship and introducing methodological tools reaching beyond, as well as challenging, the orthodox paradigms of macro- and microeconomic assumptions (Poutziouris, Smyrnios, Klein 2006). However, as it seems, the field of family business studies, as well as the accepted notions about family firms in the worlds of economy and business, retained much of their previous symbolic properties. This was by and large caused by the persistence of family business scholars to 'leave' a good part of the concept of family business unexplored and unutilized – the part of family and family dynamics. The interdisciplinary approach in the theory of family business gained momentum no sooner than the mid-1990s, but yet, fully exploiting the input of diverse academic fields addressing kinship and therefore gender issues was not an easy task to undertake. It is worth noting, that a very recent literary review exploring the extent to which gender issues and theories have been used in family business research, found out that even mentioning of gender issues in most of the identified articles is non-existent. (Heinone J & Hytti U. 2011)

In the following section we will provide data and insights resulting from short case studies done by three scholars in the field of social sciences, which show how the gender bias actually 'works' when it comes for the female members of the family to 'step forward', either in their role at the startup phase of a family company, or as possible successors/participants in the company's organizational pattern. This descriptive part will eventually lead us to a culturally constructed symbolic matrix of binary oppositions, which actually feed social practice beyond the field of economic and entrepreneurial action, into the facets of everyday life.

FAMILY FIRMS ENTREPRENEURIAL REASONING: EXPLORING THE DYNAMICS OF GENDER IN SUCCESSION AND PARTICIPATION

In this section we will utilize the research findings of two studies undertaken by S. Fattoum and J. Byrne in France in 2011 and by S. Yanagisako in Italy during the 1990s, both within the scope of addressing the structure and dynamics of family firms. Based on this material we will outline the ways by which the category of gender pervades notions and supplies sets of representations constructed around distinct symbolic operators.

The first set of case studies explores issues of gender in family business succession in France (Fattoum S. & Byrne J. 2011) The intra-family and intra-business dynamics of succession and participation in family firms is an important research topic, which according to the researchers has been not thoroughly addressed with regards to gender issues and implications. On the other hand, taking under consideration the points made in the previous section, succession practices among family firms offer an excellent basis in approaching the inner nature of gender bias as reflected in entrepreneurial reasoning and practice.

The research project scrutinized five family firms in France, exploring the underlying 'logic' behind succession models, focusing on the ways by which the issue of gender informs and shapes decisions, as well as representations of 'leadership', 'management', 'economic action', 'business'. Methodologically, the two scholars utilize a constructionist model, that is, a model which shows how social actors – in this case fathers as family owners, sons and daughters are candidate successors – produce, internalize, communicate and reproduce social differentiation and inequality. The issue of the exclusion of women in family business succession has been approached within an interactive pattern of overlying notions and cultural attitudes towards the role of women in social and economic organization. As it is evident in the results, sons seem to be preferred against daughters in family firm succession. This was actually the case in the selected family firms in France, where male descendants of the family firm founder who was also male in all of the cases, took over managerial control of the firms at the expense of female descendants.

Analyzing the respondents discourse through interviewing in exploring the phenomenon of excluding female offspring in family firm succession, the researchers came with a set of interlocked attitudes and practices throwing light to the gendered nature of intra family firms dynamics. Their main findings can be demonstrated as follows:

It seems, that in all cases reviewed, the family firm as 'a matter of family life', played a crucial role in shaping the understanding of its role in the context of family life, as well as in constructing representations about the specific roles of family members in this endeavor. Eventually, the involvement and exposure to everyday firm life during childhood is thus crucial in positioning male and female descendants with regard to their chances in succession procedures. Yet, family socialization and firm socialization seem to differ in the cases of sons and daughters. Sons, as young boys, are

encouraged to visit the family firm, thus considering it as a 'playground', which eventually fosters the development of interest for the family firm issues as they grow older. This is a practice followed by fathers and founders of the family firms in all of the cases. In contrast, daughters are 'invited' to the firm at a much later stage, when the process of socialization has already laid the fundaments of the engendered roles to be followed by them. In addition, according to the male owner/founders of the investigated family firms, the selection of sons as successors is considered more or less as natural, while daughters are really considered as an after-thought.

Although sons and daughters are equally well educated, even in the fields of management and business, fathers are deeply concerned about the capabilities of daughters in effectively managing the demanding tasks associated with the company. On a different plane, fathers are also willing to 'protect' their female offspring from the cruel world of having to deal with the management of a business. The case of many of them daughters having started out and running their own businesses could easily contradict and debunk this 'protectionist' mode of the fathers, but then again, as the data clearly show, the most of them are involved in the so called 'soft' business fields of tourism, sciences or health, which according to the fathers serve better their innate inclinations and interests.

A second set of insights revealing the role, as well as the analytical dynamics of the concept of gender in theorizing family firms and entrepreneurship, comes from an integrated study of family firms in the silk industry of Como in Italy (Yanagisako 2002). The study explores how culture – as a distinct set of notions and representation symbolically and historically constructed – mediates the processes of the production of (economical) capital in family firms. In other words, how sentiments, kinship relations, collective notions about 'work', 'success', 'family' are interwoven in economic and social production and reproduction.

In this case, the author methodologically proceeds in cross-fertilizing founding stories of family firms, stories other members of the family tell, as well as stories the official state institutions tell, with regards to the founding, succession history and timeline of the family firms in Como. The assessed data and information revealed by the respondents, provide a set of key symbolic factors which give form to wide held representations about the family, entrepreneurship, economy and economic action, male and female roles. These key symbolic factors penetrate the essence of the organizational pattern of family firms regarding the issues of start-up and founding, participation, decision-making and succession. They can be grouped as follows:

Men are considered as the actors exploiting 'initiatives' as generators of family firms, while being at the same time the genitors of sons following and fulfilling their destiny and their families' destinies. In addition, men are endowed with strong capacity for work, enacting the concept of the 'self-made man' within the wider context of a true social destiny, driving society by the momentum and impetus of their quests. The characteristics of 'strength',

'determination' and effective use of own masculine resources are attributed to men, while women succumb to the role of accompanying men in their adventurous routes. When women, as wives, daughters or sisters come into play in respect of their input and participation in family firms, their main contributions ranging from initial funding of the family firm to the actual involvement in company procedures are omitted in the firm stories told by men and can only be attained through a thorough investigation of official, state records.

CONCLUDING REMARKS

The purpose of this paper was to exploit the theoretical 'vagueness' in scholarly addressing the organizational pattern of family businesses as an opportunity and tool providing valuable insights on the engendered character of the concepts of 'business', 'entrepreneurship', 'family' and 'economy' in general. In a much wider context, the interconnection between the evolvement of family business studies amidst the contextual paradigm of main assumptions as portrayed in economic theory, and the core notions and conceptualizations of social actors within the family business world, provide a fertile ground on which the cultural category of gender can be utilized to expose the symbolic nature of both the academic, theoretical, as well as the 'performing' facet of the organizational pattern of family firms.

The presented findings of the research initiatives epitomize and reaffirm the assumption of the actual involvement of cultural dimensions informed by gender in the formation of practices regulating social and economic conduct. By deciphering these findings we will provide an outline of the symbolic categories cross-cutting entrepreneurial practices under the viewpoint of the core symbolic operator of gender (Stewart 2010). This would result in a table demonstrating contradictory and mutually exclusive categories by which people attach meaning to their actions:

Competing Categories Regulating Entrepreneurial Reasoning And Practices In Family Firms And Family Firms Scholarly Discourse Based On The Symbolic Properties Of Gender

FEMININE	MASCULINE
Domestic	Market-Economic realm
Kinship	Business
Private	Public
Passive	Active
Soft	Strong
Amateurism	Professionalism
Diffuse	Effective
Self-indulgent	Determined
Following, Supporting	Initiating, Founding
Humanities	Sciences

This approach should not be considered as paying fair dues to a structuralistic model of reasoning, dividing the world into clear-cut, antagonistic camps. As it has been made evident, social actors within family firms, as well as academic inquiry addressing family entrepreneurship are more or less equally influenced by this scheme. Family entrepreneurship in both academic and laymen discourse and reasoning seems to float across the interstices of a dualistic pattern informed by perceptions and representations of gender as presented in the above table. The challenge doesn't lie in trying

to deconstruct these dichotomies and stereotypes, pretending that they are non-existent or suggesting that it is simply an issue of 'power' and subjugation what it's all about here. However true and commonsensical, yet much more than this, it will probably help considering a universal phenomenon of social and economic conduct – the family firm – as having a great potential in serving as a good place to start with, bringing cultural change, in showing that contesting social categories based on gender are not of a contradictory, but of a complementary nature.

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PASSING THE TORCH
MENTORING AND LEARNING IN WOMEN ENTREPRENEURSHIP

A STRENGTHS-BASED APPROACH TO MENTORING WOMEN ENTREPRENEURS
HOW TO FREE THE STRENGTHS WITHIN THEM

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ABSTRACT

Entrepreneurship has long been regarded as the route towards European recovery and growth. The contribution of female entrepreneurship is of utmost importance as women bring into business ventures attributes such as team spirit, synergy, intuition, mutli-tasking, commitment, social awareness, which are beneficial both for entrepreneurial advancement and society as a whole. However, women wishing to pursue or/and maintain a successful entrepreneurial path are still faced with a persistent gender gap prevailing in both entrepreneurial practice and culture. Despite an encouraging recent increase in the number of women entrepreneurs, their representation is still limited amounting to about 30% of EU entrepreneurs. Mentoring is recognised as an effective process for the personal and professional development of women entrepreneurs. It is flexible, realistic and adjustable to their true needs, expectations and business context. In a mentoring relationship of equality and trust, the mentor provides just-in-time knowledge, skills and experience needed by the woman entrepreneur while guiding her to make decisions through self-reflection and evaluation. The woman entrepreneur learns from the mentor's experience in a social context fostering discovery and is more likely to transfer new learning on her business because it is more meaningful and necessary. Strengths-based mentoring can be an even more effective and dynamic developmental process for the woman entrepreneur. It enhances social interaction in which the men-

tor facilitates the woman entrepreneur to discover her strengths and use them in novel situations to achieve her goals while affecting the business social and cultural environment. Being aware of her strengths, the woman entrepreneur engages in self-reflection and evaluation and develops both personally and professionally. The mentor is instrumental in enabling her to discover her strengths while guiding her to use them in her business and release her untapped potential. By presenting a real case study of a woman entrepreneur, this paper discusses the practical value of strengths-based mentoring while it presents an innovative strengths-based approach, 'feel the mentoring©', a human oriented model that enhances personal experience and the professional milieu in which a woman entrepreneur performs. 'feel the mentoring©' enables the woman entrepreneur to discover, recognise, emerge, free, use, combine and evaluate her strengths and sustainably employ them in her professional and personal life. While discussed in the context of female entrepreneurship in this paper, 'feel the mentoring©' is by no means restrained to it since it can be equally successfully applied with male entrepreneurs, employees, or unemployed individuals who wish to gear their inner strengths to their professional and personal advantage.

Keywords: *Female entrepreneurship, natural talents, strengths, strengths-based mentoring, 'feel the mentoring©'*

MORE WOMEN ENTREPRENEURS ARE BENEFICIAL TO THE EUROPEAN ECONOMY

Entrepreneurship has long been suggested as a 'must-go-path' towards European recovery and growth, especially during the last years that the entire continent has been faced with a severe economic crisis. In this context, the contribution of female entrepreneurship is of utmost importance especially as women bring into the business practice attributes such as team spirit, synergy, intuition, multi-tasking, commitment, social awareness, etc. that are beneficial both for entrepreneurial advancement and for society as a whole. However, women wishing to pursue or/and maintain a successful entrepreneurial path are still faced with a persistent gender gap prevailing in both entrepreneurial practice and culture. Despite an encouraging recent increase in the number of women entrepreneurs, their representation is still limited amounting to about 30% of EU entrepreneurs. In fact, "Not only is this gender imbalance unfair to women, but it is also damaging to the European economy at a time when the EU needs more entrepreneurs to fuel its economic recovery and create the SMEs which are the backbone of the European economy and its main job-creation engine"[1].

A STRENGTHS APPROACH FOR THE 'BUSINESS WEAK' FEMININE GENDER

Women entrepreneurs still constitute a minority in the business world mainly due to various barriers that arise from their feminine gender such as anachronistic societal and cultural perceptions, plans to make a family while in

1. http://ec.europa.eu/enterprise/magazine/articles/smes-entrepreneurship/article_10986_en.htm

business, need to undertake multiple roles in their business and at home, the difficulty to convince investors and raise capital, feelings of insecurity and fear of failure in a tough business world (Winn, 2005). In order to overcome these barriers, there have been numerous (formal and informal) approaches, initiatives, programmes, methodologies and tools that actually help women to 'surf' successfully through the waves of the business growth cycle, making the constraints they are faced with irrelevant.

As presented in this paper, one promising and dynamic approach for any woman entrepreneur or wannabe entrepreneur relies on her efforts to identify, understand and make proper use of her existing inner strengths in her business endeavors. During this process, that actually sets free the strengths within her, a mentor is catalytic in facilitating her to recognise her strengths, with a focus on those that empower her business growth and at the same time manage to surface and exploit her untapped potential. It is noted that this approach fits both sexes and it is practiced by both; nevertheless, women tend to be more receptive to trying such informal methods.

BRINGING 'CAN DOS' ON STAGE

Strengths-based mentoring is a leading edge approach that yields positive results as it is an evolutionary experience for both mentors and mentees. On the one hand, the mentor introduces the mentee, in this case a woman entrepreneur, to this positive psychology perspective, that enables her to recognise, identify, understand and build on her strengths so as to apply them in her different roles and phases of business growth. On the other hand, the mentor him/herself, through this evolutionary interaction, further deepens his/her knowledge and awareness on how to surface, combine, exploit and use their own strengths while in parallel this 'extra wisdom' accelerates his/her personal and professional growth.

In general, strengths-based mentoring focuses on individual virtues, talents and human ability for fulfillment rather than on weaknesses and deficits. It is a positive perspective that elaborates on, and culminates in, the things one 'can do' rather on those that one cannot. The logic is to put less effort and get more energy from those inner strengths that accumulate towards one's evolution, and make a difference in one's growth path, rather than waste most energy on things that could only improve to a pre-defined and limited scale preventing growth acceleration (Linley, 2008). This dynamic approach achieves to manifest one's 'can do' thus creating also a positive chain reaction to the immediate working (and social) environment such as colleagues, workforce and the business culture as a whole (He, 2009; Sullivan, 2000).

STARTING WITH A TRUSTWORTHY RELATION BETWEEN MENTOR-MENTEE

A caring relationship between the mentor and the woman entrepreneur is paramount for facilitating the latter to develop her inner strengths while enabling her to elevate from average to A+ performance (Linley, 2008). Strengths-based mentoring can prove an empowering experience and a meaningful drive for the woman entrepreneur. It can illuminate

the path to achieving her true potential and maximum performance out of the cultivation of mutual respect and an honest rapport between herself and her mentor, openness and trust, as well as encouragement and interest by the mentor to genuinely listen, understand and respond to her concerns. Such an experience can provide a fertile ground and an ample opportunity for the woman entrepreneur to speak to her mentor about the strengths she is already putting to use and with what results, the strengths she wants to develop further and use more and her intended strategy for achieving this towards goal realisation. By providing constructive feedback and continuous support, the mentor enables her to make the most out of her strengths in her professional and personal life while encouraging and inspiring her to free her untapped potential (Clifton et al., 2006; Haines, 2003).

WE ALL HAVE TALENTS

Aiming to provide deeper insight into strengths-based mentoring and unravel the ways in which it can be applied in the context of female entrepreneurship, the meaning and importance of talent is primarily discussed given that it constitutes the basis of strengths. "A talent is a naturally recurring pattern of thought, feeling, or behavior that can be productively applied" (Clifton et al., 2006:2). Talents exist naturally and are authentic aspects of individual uniqueness. They correspond to the innate ability people have to combine them and deliver performance and achievement, processes with which they are directly connected. Individuals who utilise their talents increase the likelihood of fulfilling their potential, providing effective performance on recurring occasions and situations, while achieving not good but excellent performance at work and all areas of social activity. This constitutes solid justification as to why individuals should aspire to identify, understand and cultivate their innate talents (Clifton et al., 2006; Clifton and Harter, 2003).

Natural talents are elevated to strengths through refinement enabled by the formal or informal acquisition of knowledge, skill and experience. This implies the risk that talents might be wasted in case they are not further cultivated. Strengths capacitate the individual to consistently provide dynamic and excellent performance in a given task (Clifton et al., 2006; Clifton and Harter, 2003).

WE ALL HAVE STRENGTHS

Strength is "a pre-existing capacity for a particular way of behaving, thinking or feeling that is authentic and energising to the user, and enables optimal functioning, development and performance" (Linley, 2008: 9).

Strengths are, indeed, an integral part of our human identity, constituting our intrinsic and inherent qualities that define us as individuals. However, only about one third of us are conscious and appreciative of them or certain about how we can best put them to use to achieve desired outcomes. This causes our inner treasure and the exciting opportunities lying ahead of us for a fulfilling life to perish.

Strength is delineated in three elements- performance, energy and use-all of which must be present in order for strengths to underpin and sustain optimal performance. Using strengths

energises and motivates individuals to contribute discretionary effort towards attaining their goals while it nourishes in them a feeling of achievement due to the fact that they perform in accordance with the things they are best at. Research indicates that when individuals use their strengths they feel happier, more confident and proud of themselves, more engaged at work, they perform better and have a sense of resilience for achieving their goals. To achieve these outcomes, however, strengths have to be used frequently (Linley et al., 2010; Linley, 2008).

Research by Linley et al., 2010b resulted in the identification of numerous individual strengths and the compilation of the major ones in five Strengths families: [1] 'Being', the first of the strengths families, represents the way of being in the world and comprises strengths such as Authenticity, Courage, Curiosity, Humility, Legacy, Mission, Personal Responsibility, Pride, and Un-conditionality.. [2] The utilisation of 'Communicating' strengths is conducive to the way of giving and receiving information. This family encompasses strengths such as Explainer, Feedback, Humour, Listener, and Narrator. [3] Motivating strengths family drives individuals toward action comprising Adventure, Bounceback, Change Agent, Competitive, Drive, Growth, Improver, Persistence, etc. [4] Relating strengths family underpin the way an individual relates to others and consist of attributes such as Connector, Emotional Awareness, Enabler, Esteem Builder, Persuasion, and Relationship Deepener. [5] Last, the Thinking strengths family highlights what individuals pay attention to and how they approach situations including Adherence, Detail, Incubator, Innovation, Judgment, Planful, Prevention, Reconfiguration, Strategic Awareness etc.

The discovery, recognition, emergence, freedom, use, combination and evaluation of strengths is a personal and unique pursuit of one's inherent talents which enable the realisation of one's potential and goal achievement. These are in fact the main steps of the 'feel the mentoring©' model (www.feelthementoring.gr), a unique strengths based approach to mentoring and a human oriented model that focuses on the assets of each individual as well as business, as opposed to their weaknesses, and to the ways in which these assets can be productively combined and employed to ensure success at all levels.

This section of the paper presents a successful real case study of a woman entrepreneur who applied the 'feel the mentoring©' steps i.e. discovery, recognition, emergence, freedom, use, combination and evaluation of strengths, to optimize business performance. It is noted that 'feel the mentoring©' recommends the use -at the initial mentoring phase- of a strengths assessment and development tool, such as Realise2 4M model©, as it can provide some initial insights, that could prove useful to the subsequent mentoring phases. Actually, in the case study that follows and refers to a woman entrepreneur, over 40 years old, a married mother, who has been successfully running and growing her business, a consultancy firm, regardless of the severe economic crisis that Greece is faced with, the mentee completed the Realise2 strengths test which yielded meaningful and interesting results also considered in the mentoring sessions that followed.

The aim of this real case study is to demonstrate, in practical terms, the ways in which strengths-based mentoring can support and enable a woman entrepreneur to achieve her goals by discovering and exploiting her own inner strengths as well as those of her team. It is noted that by adopting a strengths-based approach towards others, an entrepreneur can free his/her employees' strengths and elicit their discretionary effort and maximum performance; recruit, retain and engage individuals best suited to the business culture and needs; and enhance business flexibility by investing on employee potential, etc. A strengths-based perspective can further support and enhance teamwork by focusing on the team's strengths simultaneously to the allocation of tasks according to individual strengths; set the ground for dealing with change by enabling individuals to think and act in new and creative ways; enhance employee job satisfaction and self-fulfillment at work by increasing their opportunities to do not only the job they are good at but also the job they love (Linley, 2008; Pegg and Moore, 2005).

feel the mentoring©
CASE STUDY OF WOMAN ENTREPRENEUR

The woman entrepreneur (mentee) was work-overloaded with having to constantly better the end results of her team of employees, thus her daily business was over-burdened and prolonged as she had to undertake extra reading, analysis, evaluation and thus more work time, in order to maintain high quality levels of business outcomes and client satisfaction. As a result, her team of employees relied more and more on her than on themselves to minimise errors, deepen knowledge, undertake responsibility for the final outcome, etc., while she was obliged to work late hours to cover the heavy work overload (less personal time, tiredness, frustration, concern for two-speed performance); and most importantly, she was prevented from focusing on the strategic development of the business.

After having completed a strengths assessment test, during the initial mentoring session, she identified one of her top strengths to be her effectiveness in decision making, namely that she is good at it (based on her previous proven record, performance and business results) and she feels at her best when she practices it, i.e. with the process of comprehending a situation and having to take a decision under any circumstance. In brief, she enjoys decision making, she gets energised when she practises it and in the majority of times she takes the right decisions.

She realised that her strength in decision making could be the solution to the challenge she was being faced with, as long as she took the time to review the challenge, analyse the situation, and be determined to resolve it. Interesting enough, she admitted to taking numerous decisions during her daily business, and to be good at it, however, she didn't think of adopting the same procedure to address the challenge that de-energised her on a personal business/personal level. Following an intense strengths-based mentoring session, she concluded that she simply had to make time in her calendar to deal with her personal business challenge as she would do with any other project, deal, initiative, that seemed more tangible. As such, she set her personal entrepreneurial goal: to

better her business performance by working on her personal challenge.

The emergence of her decision making strength, but in a specific goal setting context that touched her on a more personal and sentimental level, led to the freedom and use of her inner strength while combining/complementing with other strengths such as her good judgment, analytical thinking, and commitment to decision making that facilitated her to modify the way work had been carried out until that time so that the employees would implement delegated tasks and responsibilities at high quality levels without needing her close and continuous assistance and supervision. To this aim, she decided to alter first the way she worked and further to guide her employees and enable them to undertake full responsibility of their work and their deliverables to the customer. She had to combine other strengths she recognised during the mentoring sessions in order to let go of, counterbalance, other concerns for the end results (e.g. concern if the end result is not of high quality how it would affect the company reputation, profit, development). For example, being strong in helping others grow, in transmissibility, in persuasion and motivational skills could help her explain why and how this new work model is beneficial to all, and the business itself, and help her team understand the importance of the exercise and at the same time engage them in this new working model.

Moreover, her mentor suggested reviewing the results of the strengths test that the woman entrepreneur had taken in parallel with the mentoring sessions. Thus, according to the Realise2© results and debrief, she was attributed with strengths such as Adherence, Catalyst, Feedback. These strengths were demonstrated in activities which she performed frequently and delivered high quality work, while also gave her energy. She understood that she could use her Adherence strength so as to focus on her goal and achieve it, and also her Catalyst strength since she wanted to introduce and implement change as to the way her employees, and herself, worked. Further, she combined and complemented these strengths with her Feedback strength which could help her debrief her employees on their performance. According to the same test results, the behaviours she was frequently exhibiting at that period, at which she performed well but did not give her energy, were Optimism, Efficacy, and Persistence. In fact, she felt that she was overusing her Efficacy and Persistence strengths in order to deliver high performance, often to compensate for the employees' lower performance, and this was one of the main reasons as to why she felt de-energised. Further, she admitted that if she continued overusing them she would experience burn out. Thus, she had to act fast by making an effort to control these strengths, in particular Efficacy and Persistence, while simultaneously empowering her employees to undertake responsibility for their work. In this case too, she used the Catalyst and Feedback strengths to compensate for her
Efficacy and Persistence behaviours and introduce new ways of working in the company. The fact that Strategic Awareness was identified as a weakness (activities at which she did not deliver high performance and which de-energised her as well), could be justified since, be-

ing concerned with the everyday performance of the employees and the deliverables they had to produce, most of her time and attention was absorbed away from business strategy. Finally, the strengths she was not employing at that period and which she could employ more in the future in order to reach her goal were Explainer, Narrator, Emotional Awareness, Order, Detail, Mission, and Planful. She truly believed that using these strengths would primarily motivate her since she would perform well and would also draw energy by applying them. Further, they could help her achieve her goal of introducing change in the ways her employees worked. In particular, she felt that using the strengths of Explainer, Mission and Planful more would enable her to communicate better with her employees, explain her feelings and subsequently draft a plan based on common understanding so as to change the way both her and the employees worked.

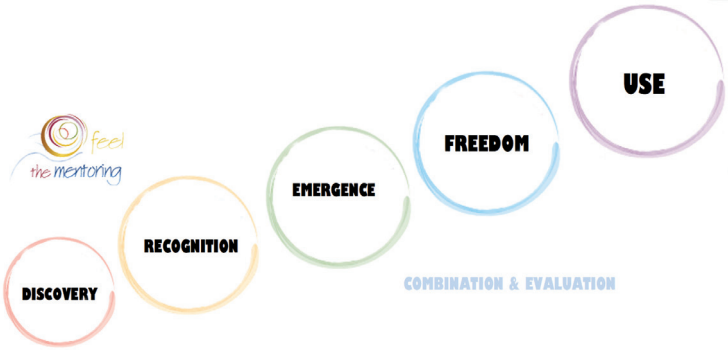
When she was asked what was the first action she took, following the mentoring session, she said that she organised bilateral meetings with all her employees during which they discussed their performance and gave her the opportunity to hear their own perception and opinion about their work and outcomes and about how new ways of working could be introduced. In these meetings, she also admitted her own feelings of being exhausted and de-energised since she had to supervise and complete their work on a continuous basis. Following this initial action, she then drafted a detailed action plan on how to move forward in order to optimise performance, by re-engineering task delegation. The action plan also included the attendance of specialised strengths-based training by the employees since she regarded it as essential for facilitating the employees to discover their own strengths while she would subsequently be able to debrief them on how they employed them at work.

Four months later, important positive results are already recorded, although the goal setting period is set for six months. Still, current progress and findings are impressive and encouraging so as to continue effort on applying the strengths approach model in meeting the challenge and reaching the goal set. So far, higher staff productivity is reported, as well as better daily work schedule for the woman entrepreneur (although still working long hours) which has allowed more time available for strategic orientation and business growth. Furthermore, by adopting the principles of strengths-based mentoring herself, she now feels better in helping her team to discover and free their inner strengths, which increases their work performance, satisfaction and experience.

Indeed, as the case study indicates, strengths-based mentoring constitutes a solid forum for the woman entrepreneur to develop self-confidence and self-efficacy, and gain a clear insight into the business environment, enhanced by self- reflection and evaluation through the lens of her inner strengths (Schwille, 2008; Clutterbuck, 2004).

This rewarding experience involves the mentor as a committed and genuine supporter. The mentor can free the strengths within the mentee through self-awareness, communication and feedback skills, authentic interest in the mentee's development and engagement with

the mentoring relationship. The mentors' own strengths and experience should be geared towards assisting the mentee to attain personal and professional goals through identifying her inner strengths and embarking on a meaningful pursuit to employ and refine them in her endeavours.



STAGES TO FREE THE STRENGTHS WITHIN YOU

The 'feel the mentoring©' strengths-based approach is a human oriented model that enhances personal experience and the professional milieu in which individuals interact. It fosters positive attitude change that results from a process of discovery, recognition, emergence, freedom, use, combination and evaluation of strengths that inevitably leads to better performance, productivity, and well- being, the essential ingredients for successful personal and business existence and growth. 'feel the mentoring©' is a dynamic strengths-based mentoring model with the main goal to free the strengths individuals have within themselves, the strengths not only of the mentee but also of the mentor him/herself, in a process of mutual development for both parties involved.

Discovery: This initial stage is crucial in the mentoring relationship and one which instigates the strengths-based approach. The mentor simultaneously discovers his/her own and the mentee's strengths, with the aim of jointly developing and refining them further and using them in novel situations and ways. This stage is of paramount importance for the mentee since it can assist her in embarking on a journey of self- recognition and development. It includes self-reflection, the process of understanding and evaluating oneself, which raises the mentee's awareness of her inner strengths and the possible ways to combine and apply them in her activities.

Recognition: Using his/her mentoring strengths, the mentor can assist the mentee in recognising the activities in which she feels capable and is successful, the things she enjoys doing every day, the activities that make a day really good, her achievements to date, the situations in which she experiences flow, authenticity

and positive energy. Apart from recalling past experiences, the mentor can also stimulate the mentee's visualisation about the future by encouraging her to see into her goals and expectations, her vision for life and business, her aspirations about everything she wants to achieve. Further, at this stage, the mentee is enabled to recognise her weaknesses in activities in which she does not deliver optimal performance. These are activities which she must not disregard but rather control to prevent them from interfering with her daily work.

Emergence: This stage complements the preceding ones, being core in strengths-based mentoring. It cultivates the ground on which the mentor enables and prepares the mentee to free the strengths within her and comprises steps that guide her to set goals, prepare to free strengths, and achieve success. It is an intensive stage during which mentor and mentee focus on emerging the identified strengths that could be faced with some resistance arising from existing habits, fears, weaknesses, social and cultural perceptions, even with difficulty in realising how the emerging strengths can be so catalytic for goal setting and attainment.

Freedom: During this reviving stage, the mentee manages resistance and frees her strengths. She gets empowered by having reached a high level of understanding of the full potential and dynamics of her freed strengths and experiences a sense of fulfilment, personal satisfaction, and optimism that her goals can be accomplished by putting her existing strengths in action. This stage is, in fact, one of personal transformation which enables the mentee to perceive and respond to challenges in a more positive and successful way.

Sustainable and optimal use and combination of strengths: Following the previous stages, the mentee is now enabled, persuaded and excited to put the freed strength into practice in a continuous and repeated way in order to achieve set goals. The use and combination of strengths enables her to anticipate and manage challenges, identify options and their consequences, select the best option for a given situation and context and deliver optimal performance. This stage implies, and requires, that the mentee is flexible and proactive in putting her diverse strengths to the best of use each time while taking caution to use them to an optimal degree and avoiding overuse.

Evaluation is, in essence, a continuous and integral process during strengths-based mentoring. The mentor empowers the mentee through strengths-based feedback, which is primarily constructive focusing on the mentee's strengths, and recommending ways in which she can employ them in similar or novel situations and contexts. The mentor further evaluates whether the mentee uses her strengths sufficiently each time since overusing them could produce unwanted results or affect future possibilities. This approach creates opportunities for further developing the mentee's strengths and assisting her in adopting fresh insights into professional and personal prospects. By providing strengths-based feedback, the mentor fosters the mentee's engagement and fulfillment contributing to higher performance and achievements in her business.

As a concluding remark, it should be noted that although this paper focused on strengths-based mentoring for women entrepreneurs, it is by no means restrained to this target group. In fact, strengths-based mentoring can be adjusted and applied in any formal mentoring relationship with women and men, entrepreneurs, employees, or individuals who wish to discover, understand, refine and free their strengths in their work or personal life in order to exploit their untapped potential and deliver high performance for attaining success.

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BEHAVIORAL ASPECTS IN ENTREPRENEURIAL REASONING

HOW OVERCONFIDENCE INFLUENCES ENTREPRENEURSHIP

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ABSTRACT

The only thing certain in economic life is that most of it is conducted into an uncertain environment; that raises a question though: what makes individuals to pursue entrepreneurship which engages too much risk for an unsure, or too little, return? Entrepreneurs appear to be individuals that would try to make profit even if the odds of achieving their goal are really slim; apparently statistics do not seem to affect their decision. Research has shown that people tend to be optimistic when a decision is made under uncertainty (Taylor and Brown, 1988) and exhibit overconfidence in judgment (DeBondt and Thaler, 1995). Overconfident individuals tend to overestimate their relative ability (Svenson, 1981); therefore, their perception about their actions, probabilistically, appears to them to be safer than others that exhibit no overconfidence. The fact that entrepreneurs use all their effort and resources in the pursuit of their business endeavors may be intuitively inferred as overconfidence. A sample of 2,994 entrepreneurs provides us with interesting research findings (Cooper, Woo, and Dunkelberg, 1988): 81% considers their chances of success to be at least 70% and 33% believe their chances of success to reach a probability of 100%. In reality, about 75% of new businesses no longer exist after five years. What does this really say to us? Is it that entrepreneurs are incapable of seeing the risk or/and measure it, or is it that they consciously perceive a different dimension of risk involved in their actions? A more recent study (Wu and Knott 2006) showed as a general observation that entrepreneurs are more cautious than most of us would think or believe and the belief that entrepreneurs have bigger tolerance for risk is rather unsupported according to the empirical findings. Although there are some cases where entrepreneurs appear to be more risk averse than average, still it does not prevent them to bear risk. Such finding sounds controversial but in reality it is not. Entrepreneurs seem to set different dimensions for uncertainty, thus the oxymoron suggested above actually justifies their actions. Entrepreneurs,

believe that uncertainty has two dimensions, one, is the well-known, market uncertainty, and two, the uncertainty regarding ability. Similar to the majority of people, entrepreneurs detest the market risk but on the other hand they much appreciate their own abilities. The element of overconfidence in their ability is the factor that compensates for their dislike of risk. Practically any entrepreneurial action is dictated by the level of overconfidence in comparison to the level of risk involved. Theoretically as long as overconfidence prevails over market risk, entrepreneurs will have a high probability to undertake the projects. The purpose of this paper is to highlight the impact of overconfidence in entrepreneurial behavior.

Keywords: *Entrepreneurship Overconfidence, Uncertainty, Behavior*

Psychologists show that, mainly, people are overconfident about their abilities and about the precision of their knowledge (Baruch Fischhoff et al., 1977; Marc Alpert and Howard Raiffa, 1982; Sarah Lichtenstein et al., 1982).

Overconfidence creates a state of mind where individuals underestimate possible dimensions of potential outcomes not because they don't assess them as important, but rather because they overestimate their ability to deal with those when and if the time comes. Overconfidence has been documented in many cases and in various forms. Most of the evidence that exhibits overconfidence occurs from calibration studies. Subjects are presented with a series of general knowledge questions, for instance, which river is bigger Amazon or Nile, or prediction problems, who will win the elections. In addition the individuals were asked to assess the probability their answer to be correct. In the majority of such studies individuals assessed the probability of their answer to be correct as very high, though the outcome of their answers was not in accordance with the probability stated earlier. This finding clearly suggests that people perceive their knowledge to be more accurate than it really is and assess their ability better than average. Consequently the element of overconfidence could be playing a vital role in the decision making process. Similar results occurred even when individuals were asked to stake money on their answers, not exhibiting any change on their answers or the assessment of how accurate they think their answers are. Even in more extreme cases where individuals said that they were certain regarding the accuracy of their answers, only 80% were in fact correct. The overconfidence phenomenon persisted again. Even when individuals were exposed to the correct answers, still the level of their overconfidence was not affected. The question that arises is thus, don't people learn out of their mistakes and try to correct their overconfidence?

Clearly, people do learn when the consequences of their errors are frequently presented to them and sometimes from overconfident they become less confident. But in general people tend to be biased towards overconfidence. Probably a significant part of overconfidence is forgetting about contrary evidence or underestimating unfavorable results, considering them as unique or extreme cases.

The purpose of this paper is to highlight the importance of overconfidence in human behavior

and emphasize on how overconfidence is affecting entrepreneurial behavior in particular.

DeBondt and Thaler (1995), suggested that, "Perhaps the most robust finding in the psychology of judgment is that people are overconfident."[1] Overconfidence is the driving force that encourages individuals to take on ventures that other individuals might not undertake. Some might say that such decisions engage some level of irrationality, but recent studies have provided significant evidence why such an irrational behavior can, and most of the times, do persist.

In the last decade, work in economics and finance (e.g., Delong, Shleifer, Summers, and Waldmann (1991), Daniel, Hirshleifer, and Subrahmanyam (1998), Odean (1998)) area suggested that overconfidence triggers a behavior that theoretically is irrational but practically is highly applicable. Numerous examples can be found in the behavior of investors and analysts in the stock market, where people exhibit irrational behavior just because they overestimate their ability or perceive that the probability of being wrong is very small. Dale Griffin and Amos Tversky (1992) stress that in cases where predictability is very limited, as in securities markets, experts may even be more inclined to overconfidence than novices. In other words, the uncertainty that evidently exists in a stock market may be compensated by a high level of overconfidence in order for a decision to be made. In theory, decisions should be made when information is sufficient. In practice though, when decisions should be taken and the information doesn't suffice, overconfidence steps in to rationalize a decision.

OVERCONFIDENCE AND ENTREPRENEURS

Overconfidence among entrepreneurs has been documented in the work of Cooper, Woo, and Dunkelberg (1988). More specifically in a sample of 2,994 entrepreneurs, 81% of them, approximately 2450, believe that their chances of success are at least 70%. The 33% of the sample believe in an absolute 100% chance in succeeding, whilst the 75% of new businesses will fail shortly after inception or will not make it within the next 5 years.

Another research by Busenitz and Barney (1997) revealed that when entrepreneurs were asked a question related to whether cancer or heart disease is the leading cause of death in the United States, against other individuals, entrepreneurs present a level of confidence in their answers which was significantly higher than others', whilst the number of correct results were equally dispersed.

Entrepreneurs frequently exhibit the tendency to underestimate the likelihood of unfavourable results to occur. The chances of a new venture to fail or the profit that a firm will earn, as also the reaction of the competition, have been underestimated because the entrepreneurs

1. DeBondt, W.F.M. and R.H. Thaler, 1995, "Financial Decision-Making in Markets and Firms: A Behavioral Perspective," in R. Jarrow, V. Maksimovic, and W. Ziemba, eds., Finance, Elsevier North Holland, Amsterdam, Handbook in Operations Research and Management Science, Vol. 9, Chap. 13, 385–410.

show overconfidence in their ability which prevents all unfavourable things to happen.

Palich & Bagby (1995) and Busenitz & Barney (1997) indicated that while the majority of managers are overconfident, entrepreneurs exhibited greater overconfidence than managers. This finding suggests that several launches of new ventures were the outcome of the overconfidence that entrepreneurs show. Equally, overconfidence could be to a degree responsible for the fairly high incidence of new venture failures, given that overconfident entrepreneurs are expected to overestimate their ability to make correct decisions in launching and developing their new businesses.

It follows that if entrepreneurs normally display overconfidence, also young entrepreneurs may possibly exhibit overconfidence when shaping their intention to start their own businesses.

Several studies by (Douglas & Shepherd 2002; Fitzsimmons, Douglas and Shepherd, 2005), suggested that the purpose to become self-employed has a high level of dependency on the individual's feelings to independence, ownership, and risk. In other words, individuals because of their perceptions may be encouraged to proceed with a new venture. Hence a question that arises, is if entrepreneurial intensions are affected independently by overconfidence, or overconfidence operates as a moderator of these entrepreneurial intentions?

Both instances, in my belief, work complementary. The sense of independence, ownership and risk may be facilitated by becoming self-employed, while not exhibiting confidence about own ability to succeed, the attempt will fail.

The level of confidence that individuals exhibit will perform as long as it becomes a conscious belief. According to Forbes (2005), a distinction is made between overconfidence and self-efficacy. More specifically, Forbes clarifies overconfidence as a measure of accuracy of an individual's ability, while entrepreneurial self-efficacy measures the individual's perception of their abilities. Such distinction suggests that overconfidence becomes a subconscious phenomenon whereas entrepreneurial self-efficacy evolves into a consciously held belief. In addition Forbes (2005) claims that an individual's entrepreneurial self-efficacy varies to different levels of over-inflated opinions about their abilities. In such cases the more over-inflated opinion, the higher the probability for individuals to demonstrate overconfidence in their abilities. Based on that, several entrepreneurs, with past business successes, will inevitably turn out to be more overconfident because the self-efficacy level is very high. Thus, overconfidence seems to act as an independent variable that holds the relationship between entrepreneurial self-efficacy and entrepreneurial intentions.

Overconfidence replaces lack of information by overestimating ability. Langer (1975) has observed, that the more difficult the task, the greater the chance of overconfidence to kick in and increase. On top of that, individuals that successfully completed tasks in the past experience an increase in their confidence regardless if this confidence is justified or not. From a point onwards, individuals tend to disregard

the information or the risks associated to a task and are based solely on their over-inflated ability, which is build up on past incidents which might not have been always successful.

When entrepreneurs are overconfident they exhibit the tendency to follow their own information, down-weighting the public available information or ignoring the complete lack of any information whatsoever. The rest of the individuals that observe such behavior tend to believe that entrepreneurs are fearless of risk or that they have a higher level of risk tolerance. Such perception existed for many years and mainly was considered to be one of the distinct characteristics of entrepreneurs. A study by (Wu and Knott 2006) 2005) provided contrary information to that belief. More specifically, Woo observed that entrepreneurs are more cautious than most of us think. In several cases, entrepreneurs appeared to be more risk averse than the average, without though being discouraged in undertaking new ventures and obviously risk. Such a finding seems contradicting but actually is not. The explanation to that is based on the perception that entrepreneurs place to risk. The majority of individuals identify risk as the level of uncertainty of something to happen or not, therefore the greater the uncertainty the greater the risk. Entrepreneurs set different dimensions for uncertainty, which allows them to proceed with tasks, which for the majority of individuals appear very uncertain.

Entrepreneurs believe that uncertainty has two dimensions, one, is the well-known, market uncertainty (systemic risk), and two, the uncertainty regarding ability. Like the majority of people, entrepreneurs dislike risk but on the other hand place great value on their ability. The appreciation of their ability comes in and compensates for the market risk, thus any new venture becomes less risky and possibly more appealing.

Such findings imply that, as long as there is a great appreciation in the ability of the entrepreneurs no venture is risky enough to discourage them. Conversely, if a high degree of uncertainty exists regarding ability, entrepreneurs will avoid entering in such ventures because their perceived lack of ability will never overcome the systemic risk.

It appears then, that the volume of information which could reveal the level of uncertainty in a venture somehow becomes insignificant. Non entrepreneurs try to be rational by supporting their decision not only on private but also on public information. Entrepreneurs do the same but place more weight on their own information which is the outcome of their ability, and reduce the value of public information.

CONCLUSION

In this paper it's argued that overconfidence is something that characterizes human behaviour in most cases. People tend to appreciate their knowledge highly even in cases where prior experience is contrary to that. The literature suggests that such overconfidence is something to be expected and most probably in cases where little information is available, but the impact of overconfidence on people's behaviour may differ depending on their perception about uncertainty.

Non entrepreneurs exhibit overconfidence up to the limit on which the information is considered insufficient therefore the task in hand becomes uncertain. Entrepreneurs on the other hand exhibit similar overconfidence regardless of the available information. The driving force is the self assessment on their skills and ability which appears to be unrelated to the level of information. Their ability is enough to compensate any lack of information. Clearly, when entrepreneurs over assess their ability or believe that their ability will suffice to overcome objective difficulties, then the probability of failure increases significantly. Prior failures do not discourage them because part of overconfidence is isolating unfavourable results, thinking of them as out of the norm.

Entrepreneurs behave in a rational manner contrary to what other individuals may think, under the influence of overconfidence which apparently characterizes human behaviour. A question for further research that rises is when, or under what circumstances entrepreneurial ability is not sufficient to overcome the risk in any new ventures.

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WOMEN ENTREPRENEURS AND ICT

THE CONTRIBUTION OF TECHNOLOGY IN BUSINESS GROWTH
THE CASE OF GREEK LADIES

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ABSTRACT

The overall image of the use of digital technology by Greek women is not that encouraging. Starting from the Information Communication Technology (ICT) companies in the Greek market, there are only few ladies in high management or entrepreneurial positions. The involvement of women executives in ICT industry is mainly related to HR & Marketing functions. In addition, the statistics on the use of internet show that, although the penetration of it to the population is growing rapidly, there is a steady 10% gap between the use of it comparing men 55% and women 45%. It becomes also obvious, in relevant market surveys, that internet is commercially underutilized in Greece i.e. there are less financial transactions or shopping made over the internet in comparison to the EU average. Optimistically enough a BCG study of 2012 suggests that a systematic growth of transactions over internet, including G2C provided services, could contribute significantly to the increase of country GDP. So, Greece, a country in financial crisis, should leverage on the use of technology in order to support development. Amidst the general obscured business landscape, there are few brilliant examples of Greek business ladies who have developed their businesses "online". By using all possible methodologies and tools, including digital media and social networks, they managed to break language barriers, geographical barriers and set up their own micro operations, that can respond to customer request in the broader area, or even globally. Under the same concept one could find some interesting business examples from other EU countries, especially from distant or dispersed areas. These micro businesses cover multiple market industries even non-conventional ones such as e-tailing, parent services, publishing, IT support, energy consumption or even specialized handcrafted

goods. In this specific paper we are going to refer to hints and tips of the micro business owners that led them to success over internet, the use of social media and the possible impact on business growth. Moreover since usually ladies in business have a very demanding schedule and multiple roles playing in order to balance effectively their lives, we will also examine the impact of using systematically digital technology for increasing work-life balance. In fact one can say that all working population can save some time using IT & digital technology to cover multiple needs. This may affect the working time zones, the communication with family members, the relationships to Commission friends, the continuous access to services and the possibility to reserve some valuable "quality time" for the lady-entrepreneur. Having that available, she can choose how to invest it again: back in business, share it with family, keep it valuable for herself. Modern European Business ladies-entrepreneurs can look at IT as their ultimate ally for business & personal development. It's cool, trendy, fashionable, it represents 2020 lifestyle. It's effective for the business since it results to better ratio cost-value, it is diverse for responding to all industries and needs and it's so inclusive, only ideas matter, not age, nation or stereotypes.

Keywords: *Stereotypes, new media, time management, diversity, technology, tips*

GREEK WOMEN ENTREPRENEURS' DRIVING FACTORS

As per international survey of 2009, Greece is rated rather high in contribution of entrepreneurs in financial life. Looking at percentages the related gender rate is 15.51% for women entrepreneurs to 22.56% for men entrepreneurs. On the contrary, in the unemployment rate female workers are about 22% unemployed vs. 15% of men workers (2010) Studies have shown that usually women start their business not out of a sheer opportunity but mainly driven by financial need or as a second or third profession. Many of them have experienced a considerable amount of dissatisfaction with their previous careers working for others, difficulty in combining professional with family life and lately loss of job. Often the above mentioned parameters force them to become their own boss, motivating them to pursue entrepreneurship. Unfortunately they usually tend to be micro-entrepreneurs i.e. handle the tiny business usually run from their home.

Once becoming business owners, women usually tend to be more satisfied and content with their personal and professional life. In addition, because of their previous careers, early retirement etc. women entrepreneurs enter the business world later on in life, around 40-60 years old. Most of them have high education degrees. Even consider, that as of early '90s more young women are qualified to enter Universities than young men.

WOMEN EXPERIENCE "WORK/ LIFE BLEND"

Most women who own their own business run a busy & complex life. The holy grail of "work/life balance" is an everyday pursuit. It is very challenging to define the balance in a uniform way, especially because those women micro businesses are run from home. Inevitably, work & personal life get blended. So, one would say instead of "work/life balance" "work/life balance", is "work/life blend".

Those of us, who already have the experience

of working from home, we already know that it is not possible to distinguish between personal & professional life. In any case, some rules should be in place in order to assist women micro-entrepreneurs in distinguishing between the two faces of the same coin. Besides, the sense of entrepreneurship leads to total and seamless obsession for one's dream, otherwise this cannot be fulfilled.

Most important, when a women needs to get the business going, starting to earn some money, as a quick win – a sign of encouragement – the solo entrepreneur may find herself working non-stop from 5 a.m. to 11 p.m. even during mealtime, or bedtime.

The inevitable result would be a woman torn apart, i.e. a sister, a wife, a mother with no sense of satisfaction, no self-respect and lots of worries and dilemmas.

Making things even worse, men entrepreneurs usually tend to extend their business hours blending them with social and sporting activities. So, evidently women should also network in order to grasp opportunities and promote their businesses.

THE GENDER GAP FOR TECHNOLOGY= GAP OF ROLE MODELS

Despite the contemporary success of young women with University degrees, there is a global, distinct gap between Human studies and Technology studies.

To bridge this parity, only recently European Commission (EC) launched a campaign in order to promote increased participation of women, and to reduce the gender gap, within the science, technology, engineering, and math (STEM) fields. Women in other professions such as medicine and law have become fixtures on television and in movies in recent decades, while portrayals of programmers still tend to follow the hacker stereotype of the lone guy sitting in his basement.

A 78.5 percent of first-year students said they regularly used computers before attending college. The figures for women and men were 77.8 percent and 79.5 percent respectively. But women spent far less time on the Internet. They were half as likely as men to rate their computer skills as above average, and were five times less likely to pursue careers in computer programming — 9.3 percent of men as opposed to 1.8 percent of women — according to a survey conducted by the University of California, LA. "Research has shown that women feel that computers and technology is a male domain, "as per research principle.

Lack of role models both in popular culture and in day-to-day life is a key reason for the parity. So, the reason why there aren't more women computer scientists is simply because there aren't more women computer scientists, a vicious circle difficult to penetrate. It is very interesting that young women who excel in technology fields are usually brought up in a relevant family environment i.e. scientists parents.

Specifically for Computer use and digital technology there is a very apparent sign of it: although the use of internet rises year over year, there is a steady gap of approximately 10% between women and men. So, we may safely extrapolate that since women are less passionate users of internet, it is obvious that their general use of internet and computer literacy overall is limited.

Thus, one could easily assume that women entrepreneurs and solo entrepreneurs equally

may be cautious with the use of internet, technology and digital gadgets.

WHAT HAS SHAPED OUR BUSINESS INTERESTS

Another aspect of how women entrepreneurs treat technology depends mainly on their Generation. A very interesting recent research, performed by AUEB professors E. Nikandrou & Panagiotopoulou is "Comparing attitude of women towards career".

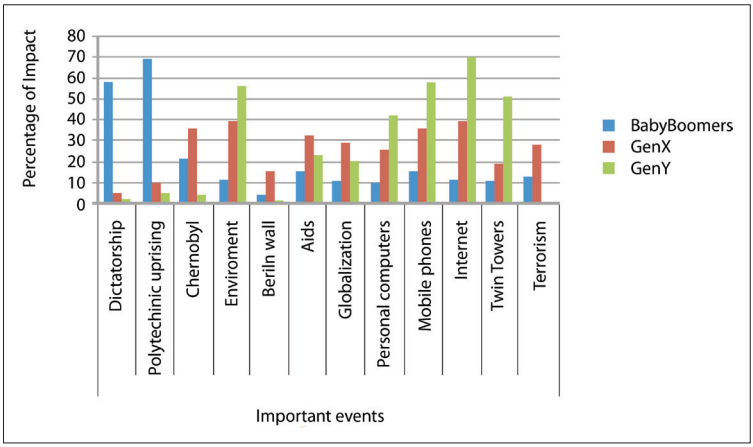
The key factors that have mainly influenced generations in Greece according to the survey are:

Baby Boomers: Dictatorship 1974, Chernobyl, Environment, Berlin wall, Aids

Gen X : Globalization, Computer, Mobile, Internet

Gen Y: Internet, mobile, NY Towers, terrorism

It is clear that Gen X and Y, active now as entrepreneurs, have been strongly influenced by technology trends.



**Source: E. Nikandrou – L. Panagiotopoulou (2012) "Career and Generation Y", Athens University of Economics and Business*

MODERN WOMEN IN MAKING BUSINESS WITH TECHNOLOGY

Despite the international findings, the same as above survey shows that woman of Generations X and Y seems to Adopt & Enjoy technology (see chart below).

This is a clear sign that the younger Greek ladies are more open to set bridges with technology and use it as a required tool.

The point is how one could influence them in order to make a broader and more relaxed use.

Thus, women entrepreneurs could more easily control costs, save time, keep in contact and be flexible with their blend of work-life.

Because of this significant role that technology plays in Gen X and Y, business life for those age groups seems more familiar accompanied by technology. However, looking at the age group above 45 years, these people as kids have not been brought up with tech-gadgets. It is rather rare and difficult to play with confidence with all new offerings available around.

CATEGORIES	BABY BOOMERS 1946-1965	GENERATION X 1966-1985	GENERATION Y 1986-2000
Career	Important in life cycle	Challenge	Mobility
Leadership	Questioning/contesting	Overseeing	Respecting
Yearning for Technology	Ruling	Enjoying	Using/Applying
Future	Creating for tomorrow	Unsure/pessimistic	Optimistic
Evaluation Feedback	Formal/Documented	Continuous/non-formal	Non-formal, On demand
Inducement Motivation	Acknowledging participation and merit	Loose adherence to norms/independence/ individualism	Team-work, Collaboration
Professional virtues	Willing to serve, communicate, provide extra outcomes	Adaptive/Knowledge of technology/non-conformist	Collective action, Insistence, Technological specialization, Competent
Professional weaknesses	Bureaucratic/Difficulties in managing conflicts/ Intolerant to different views	Anxious/Lack of communication skills/ cynical	In need of supervisionand managing, No experience in interpersonal relationships
Work/Personal life balance	"Workaholics"/ Living to work	Balancing work and personal life	Flexible working hours/ Predominance of personal life/ "Work isn't everything"

**Source: E. Nikandrou – L. Panagiotopoulou (2012) "Career and Generation Y", Athens University of Economics and Business*

European Union addresses the need for computer skills as crucial for all citizens and classifies access to fast computer networks as a priority. The widely used term computer literacy underlines that, basic computer skills are required for all, as basic skills, as reading and writing.

Computer literacy is defined as the knowledge and ability to use computers and related technology efficiently, with a range of skills covering levels from elementary use to programming and advanced problem solving. Computer literacy can also refer to the comfort level someone has acquired in using computer programs and other applications that are associated with computers. Another valuable component of computer literacy is knowing how computers work and operate. (wikipedia)

DO IT LIKE A ....'ladybizIT'!

So what are the basic functionality that Ladybiz should acquire as basic levers of computer literacy? Interacting with many Greek ladies entrepreneurs and executives, here are what they have pointed out as common main minima of knowledge & skills.

a) Progress with your English skills

Undoubtedly, the language for computers and internet is English. Not the Shakespearian version of it! Just simple and straightforward. Even 2000-3000 words can suffice for a first

hand survival with computer and internet. So if you feel week and not comfortable, as a start make some lessons.

b) A laptop is a personal tool ...

.....like your toothbrush: Usually you do not share it! Embrace this piece of equipment and make yourself comfortable with it, the same way one should personalize her desk, or her room. Nice wallpaper with a family picture of the sunset of your vacation can inspire you in tough times. Choose the letter style – fond and size – that pleases your eyes only. Then be happy and relaxed when these letters blow messages easy to read for you. Keep your desktop tide, clean, precise and rich, make it as your real desktop. In other words customize it. The same principles can apply to your 3G mobile phones

c) Learn how to search efficiently

Internet is a vast source of information for every kind of knowledge. So, learn how to select some keywords and make almost "human like question". Once your English gets stronger, you will be able to search deeper within English texts. This extends your view to business opportunities practically everywhere. In addition mastering techniques like opening links in new windows, using bookmarks, editing URLs to perform navigation, clearing the browser cache, and understanding common error messages will give you access to a world of unlimited information.

d) Write well, calculate accurately, present nicely

Word processing is the oldest application on commercial personal computers. No one wonders how easily typewriters were replaced. Learning how to use basic functions of word processing, like spell check, table creation, and working with headers one can apply also in email and a lot of other applications.

Also fundamental use of spreadsheet that can help us do accounting and other repetitive calculations with confidence and speed. Use of formulas, references, and macros can turn a "grid of numbers" into actionable information in the hands of the right person.

Last but not least make a presentation template with your logo on it, such as on your business card! Use it in order to communicate any messages structured and well organised, do not allow information to leave you without your personal business touch.

e) Privacy and Security first

Security becomes an increasingly important issue. It relates to two main concepts, computer security and privacy. Most of hardware and computer related security is automated provided that the user refreshes annually a license from a well-known security application. This can check the computer for nasty bugs, spyware, and other malicious applications. Nevertheless keep your computer personal so no other party or person, intentionally or not, can spill over harmful applications. Remember, keep your personal data private and make "backups". Content security and access to misfit articles, publications and videos is another very critical aspect that especially parents should have the basic capabilities to control.

f) Basic terminology – basic commands

Knowing some hardware terminology is a must-have skill to be a savvy user. Besides, it's practically tough to have someone help-

ing you out all of the time. Also, learning some commands like "copy-paste" is more a matter of routine than anything else; a short tutorial done once a day for a week will probably be enough to put you in the habit, and it will make you a happier, self-confident user.

g) Basic networking skills lead to endless communication

Internet cannot be provided unless your computer is "connected" to a physical network. So it is important to distinguish some devises like modem, cable vs. wireless connection, IP address, hotspot name etc. It is easier than a complex cuisine recipe, provided that you ask the right person or look up the manual with decisiveness and confidence.

h) Social media are business media

All 'ladybizIT' recognised that social media do not concern only kids and teenagers. They even exceed the need to share party pictures with friends. Social media is no more a choice for business. You can easily get to a facebook page of your product of choice (a yogurt, a soap, a magazine) and see what a powerful tool can do in the hands of marketers. Try to understand and use it respectively in order to promote your business. Specialists in one on-line marketing can be available to assist in this trip to an absolutely new land of "online interaction with every single customer".

TIPS TO BECOME A 'ladybizIT'

How can business women network, promote, stay cool and play a positive role model for their surroundings, without leaving often their home/business territory? How could they extend or duplicate time and meeting opportunities? After all, is it worthwhile for a woman to run a business more than 12 hours a day?

Here are some rules to keep women entrepreneurs comfortable and their stress under control in a "work/life blended style". In these rules technology has a significant role to play.

1. Use tools, adopt technology

Ask your children or other younger members of your entourage to give you some tips, hinds. Let them guide you. Show your sense of humor with the difficulties. This will improve your interpersonal communication. Also ask your bank to enlighten you with the world of e-banking and your most capable friends with the best experience of e-tailing, ticket services or simple troubleshooting in searches .

In other words there is no way to cherish the goods of technology available to us, unless you adopt it with your heart. In return, technology pays back, has no discriminations and can promote your ideas as fresh and vivid as you only can produce them.

2. Set Zones – keep promises

You may not be able to turn off your computer at 5 o'clock, but you should set rules for your working time. If you work out of your home, it's even harder to resist checking your email or 3G mobile even on a sleepy Sunday, but do. Strive to separate work time and family time by closing the door to your office space, respect the 7-9pm. zone with children or place your yoga class at your computer scheduler, so no meeting pops up the inappropriate time. Participate in a blog with other professionals on time management and read others' ideas that seem applicable to your lifestyle.

3. Share your Expectations, make allies

It is better that you share with your close family members your dreams and your targets. Improve verbal communication with your dears. Ask them if they agree with your dreams to support you. Then you can easier ask them for some favors or backups. If you do so, then digital communication, SMS, Viber, Skype, can improve the coordination for day to day needs without widening the gap. For example, why not create a facebook group for school and through it share children commuting with neighbors and friends.

Activating your mobile alerts, reminders that can save you time and give you the sence of control you need.

4. Occasionally....Take a Real Break

Small business owners, especially moms, are often reluctant to take vacations, but those who do feel better go for it. Even if you believe you are indispensable at work and at home, find a way to have someone else taking over your duties for short breaks, a person willing to support you even on a swap-basis. Still, you will have to communicate with this person but it is easier with one instead of answering your emails all time. Be sure, your spouse your family will be closer to you after a constructive common interval. Even if you are alone, a better self can be much more creative and productive after a real break.

CONCLUSION

Women entrepreneurs have become a strong driving force in today's economy. They usually are experienced, qualified and well educated. Their primary goal is not only monetary reward but rather personal satisfaction. Yet despite the forces & opportunities, many prospective women entrepreneurs are intimidated to move out of their comfort zone. Unfortunately, between other competences, technology is still out of women entrepreneurs comfort zone.

So, for these women, it is advisable to adopt 'ladybizIT' as role models and get inspired by them. They should get motivated by surrounding female business networks, such as TOGME or other long lasting clubs where successful trends are shared openly. Women should plan their transition towards information technology and mobility, asking as guides even their kids or other young and willing family members with open eyes and sheer eagerness to communicate.

Last but not least, women entrepreneurs should evaluate how to rely extensively on social media, mobility and e-commerce, as they can offer them global, diverse, inclusive fields for their business ideas.

SOCIAL WOMEN SHARE
TECHNOLOGY AS AN ENABLER

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ABSTRACT
The concept of Social Media is at the top of the agenda of many entrepreneurs, business executives and decision makers today. This paper examines the new media and digital culture which has become an important part of our daily activities, using the social network perspective, a theoretical concept as used in the social and behavioural sciences. This theoretical perspective allows us to identify the dynamics of social networks: the concept of social media today, for many a new and stimulating environment and for others a social space that evokes feelings of frustration or fear of losing touch with the real world. Are women equipped to thrive in this digital age and especially in this virtual environment? In examining current research findings on social women, new models of work, levels of engagement, transformational leadership styles and women entrepreneurs that have been de-mystifying the world of social media through the lens of their own experiences, this paper argues that women enjoy a slight edge over their male counterparts and that today's business climate is more inviting for aspiring women entrepreneurs. The bottom line is that social women are doing what most women do "naturally", namely creating relationships, community, connections and support. Isn't that what social networking is all about? Social women share content in multiple ways and working online has been a financial windfall for many, including stay at home moms and homemakers. Finally, this paper presents tips and advice from successful women entrepreneurs who tell how they have been using social media to excel in their careers and balance their career/family/personal lives.

Keywords: *New media, social media, social networking, technology as an enabler, integrating a gender perspective, "feminine" skills and leadership qualities*

INTRODUCTION: WHAT IS SOCIAL MEDIA
The new media and digital culture, for many a new and stimulating environment, has become an important part of our daily activities. Yet we have hardly begun to understand to what

extent the new media has changed our daily lives, practices, habits and culture. This paper examine social media using the social network perspective[1](Wellman 1988), a theoretical concept used in the social and behavioural sciences, which refers to a social structure made up of a set of actors (such as organizations, social groups, individuals, etc.) and the ties established between these actors. Social network analysis is a perspective within the social sciences and not a method or narrowly-defined theory. Social networks are formally defined as "a set of nodes (or network members) that are tied by one or more types of relations [...] network analysts take these networks as the primary building blocks of the social world, they not only collect unique types of data, they begin their analyses from a fundamentally different perspective than that adopted by individualist or attribute-based social science." (Marin & Wellman 2009) In other words Alexandra Marin and Barry Wellman (2009) argue that social network analysis is neither a theory nor a methodology but rather a perspective/paradigm. This paradigm allows researchers to identify and examine the dynamics of social networks, the web of group affiliations, global or local patterns, influential entities, relations and their patterns. Three examples of such a social structure and social network are the social media: Facebook, Twitter, Pinterest, etc.

The concept of Social Media today is at the top of the agenda of many entrepreneurs, business executives, decision makers, etc. who want to identify ways to make commercial, cost-effective and profitable use of applications such as YouTube, Facebook, Twitter, and Second Life. However, despite this interest, there seems to be very limited understanding of what the term "Social Media" exactly means. In their study Andreas M. Kaplan & Michael Haenlein. (2010) begin by describing the concept of social media and how it differs from related concepts such as Web 2.0 and User Generated Content. They define social media as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content. Kaplan & Haenlein (2010) classify the social media into more specific categories according to group characteristics: social networking sites, blogs, collaborative projects, content communities, virtual game worlds and virtual social worlds.

Facebook, Twitter and Pinterest are only three examples of today's social media, a type of online media (new media) that expedites, promotes and encourages social networking as opposed to traditional media, which delivers content but doesn't allow viewers/readers/listeners/audiences from diverse social groups to participate in the creation or development of the content. In other words, social media is interactive and accessible to everyone throughout the globe. It includes mobile based and web-based technologies which allow conversation and turn it into interactive dialogue between social groups, organiza-

1. Social networks analysis, now one of the major paradigms in contemporary sociology, emerged from sociology, social psychology, statistics, etc. (see Georg Simmel, Jacob Moreno)

tions, communities and individuals. Paula Uimonen (2012) argues that social media is all about intercultural interactions through innovative forms of ethnographic representation that weave together visual and aural narratives making sense of and unfolding the stories narrated in a dramatic world: visual observations, interviews, life stories, etc.

For many using social media provides opportunities to reach and connect with a diverse range of people from all around the globe, for others the social media evokes feelings of frustration, fear of losing touch with the real world or getting lost in the swirl of Facebook, Twitter, LinkedIn, etc. Nevertheless, research shows that social media is here to stay! (SheSpeaks 2012, Marien & Van Audenhove 2010, Kaplan & Haenlein 2010) It's all about engagement, looking for connections and opening a dialogue. It's a matter of igniting the desire for interaction, commentary, and conveyance of ideas that powers social media.

The power of social media has a tremendous impact in modern society since it can mobilize mass audiences towards a specific purpose, ignite revolts against oppressive regimes, etc. For example social media played a major role during the "Arab Spring", the Arabic rebellions or the Arab revolutions. Arab Spring refers to the uprisings that arose independently and spread across the Arab world in 2011. The movement originated in Tunisia and quickly spread to Egypt, Libya, Syria, Yemen, Bahrain, Saudi Arabia and Jordan. This revolutionary wave of demonstrations and protests that began on December 17, 2010,[2] has to date forced from power rulers in Egypt, Libya, Tunisia and Yemen. Civil uprisings and protests erupted in Syria, Bahrain, Jordan, Morocco, Algeria, Iraq, Saudi Arabia, Sudan, Lebanon, Mauritania, Oman, Western Sahara, clashes at the Israeli borders, and these uprisings and protests are continuing in 2012. The role of websites such as Twitter and Facebook in igniting revolts against oppressive regimes is very powerful (Chebib & Sohail 2011, Storck 2011) Namely, Facebook and Twitter have helped people in organizing and coordinating protests, by cross-communicating and information spreading, not only during the revolution in Egypt against President Hosni Mubarak but also during the demonstrations in Athens by the movement called "Aganaktismenoi" (the Resentful or the fed-up), namely demonstrations organised and coordinated by the Facebook Group and Twitter Pages proving that social media can be used as a tool to 'change' the world.

An anonymous Cairo activist is quoted in a study by Nadine Kassem Chebib & Rabia Minatullah Sohail, (2011: 139) which explores the impact social media had on the Egyptian Revolution in 2011 which ended with President Hosni Mubarak's resignation on February 11, 2011, thus ending his 30 year old regime. According to a Cairo activist, "We use Facebook to schedule the protests, Twitter to coordinate, and YouTube to tell the world" The combination of different social media channels under a co-

2. See: Source Watch: http://www.sourcewatch.org/index.php?title=Arab_Spring

herent and concrete strategy can mobilize not only political changes but also every aspect of our lives and of course the entrepreneurship's arena as well. Facebook founded in 2004 as a website platform for Harvard students and after 8 years has reached more than 800 million active users. The second most famous/popular social media channel worldwide is Twitter with over 140 million users. Undeniably, social media is extremely powerful. But is it as easy as is seems?

NEW MEDIA

Most technologies described as "new media" today are digital. That is, new media does not include paper-based publications, books, magazines or television programs, unless they contain technologies that enable digital interactivity. For example, the online encyclopaedia Wikipedia allows interactivity since it combines Internet accessible digital images, texts, or videos with web-links and allows contributors to participate creatively, provides interactive feedback, etc.

New media -a broad term in media studies that emerged in the latter part of the 20th century- refers to immediate access or real-time generation to content on any digital device. It refers to digital technologies–social media, games, data visualizations, software, mobile technology and digital music, CD-ROMS, and DVDs. Another aspect of new media, as previously cited, is users interactive and creative participation, including community formation, a social structure made up of a set of actors, community formation around the content: i.e. social media which is ufolding a digital culture of social relationships and community building through online conversations and social networking.

Consequently the new media has also been providing opportunities to promote "democratization" processes with regard to publishing, creation, creativity, distribution and consumption of media content, and not only! The democratization process also include the role of social networks in tackling the digital divide, the concept of technology as an enabler or a digital agency to promote best practices, advocacy and education, (Dr. Kamberidou & Fabry 2012, Dr. Kamberidou 2010). Technologies such as social media are used in a variety of ways, not only to talk about current events, ensure mobilization, organize around an issue, solve problems or defuse anger, but also to enable professional growth. Many women entrepreneurs, for example, have been using the social media to market their businesses, raise their profile, etc. However, before jumping into social media you need to know and clarify what you expect from it. What are your social media goals? For example, if you are an entrepreneur (1) how will social media support your initiatives or your business, (2) increase revenue, (2) decrease costs, (3) increase customer support, etc. You need to be willing to work for the long-term payoff and/or hire a media expert/manager, among other things.

TECHNOLOGY AS AN ENABLER

More and more people today are using technology, digital tools to work independently, market their brands or ideas, monitor results instead of hours and in particular to balance their personal/career lives, which the traditional model, namely the long-hours tied down

to a desk model does not permit. (Dr. Kamberidou & Fabry 2012) Technology as an enabler means flexible working conditions for both women and men. Digitally mobile lifestyles and virtual workplaces refer to new models of work, flexi-programs and schedules, which are usually perceived as a benefit for women with children and associated with low commitment. This is untrue! Firstly, the demand for greater flexibility is not only about motherhood. Not only women want more flexibility in relation to work today. For example teleworking—working at home using a computer and phone— is most common among highly skilled senior-ranking men. (Cox & Maitland 2009)

New models of work are emerging due to globalization, changing demographics and social attitudes. For example, parenthood is a role that men are increasingly sharing, and the concept of retirement is dying as older people now work beyond retirement age and young people are taking time off to travel, study, work for non-profit organisations, do volunteer work, etc. In other words, careers are no longer linear and unbroken. (Dr. Kamberidou & Fabry 2012) Needless to say, digital tools are also giving women the chance to build a business from home and create unique work schedules, especially working moms.

Aspiring women entrepreneurs have been relying on this flexibility to achieve the so valued career-family balance. A growing number of women entrepreneurs have been de-mystifying the world of social media through the lens of their own experiences and providing us with a look at how social media has significantly enhanced the growth of their businesses, a topic examined in the sections that follow. One need point out here that numerous studies show that women enjoy a slight edge over their male counterparts when it comes to social media. (Cowley 2011, Woolley & Malone 2011, Karacostas 2012, Akalp 2012) Research shows that women seem to possess stronger communication skills and social intelligence than men and are also better listeners (Cowley 2011, et al., SheSpeaks 2011). In today's digital economy which requires these skills, these so-called "feminine" skills and leadership qualities—whether the result of biology or social conditioning— are more significant now than ever.

COLLECTIVE GROUP INTELLIGENCE RISES WHEN WOMEN PARTICIPATE

A recent study published in the Harvard Business Review shows that women excel in communication skills, are better listeners than men, and not only. (Woolley & Malone 2011) The study finds that the collective intelligence of a group rises when the group includes more women, despite the standard argument that gender diversity is essential in order to achieve better results.

What makes a team smarter? Anita Woolley and Thomas Malone (2011) argue that the more women on board the better the results. According to their findings there is little correlation between a group's collective intelligence and the IQs of its individual subjects, whereas the collective intelligence of a group rises when the group includes more women. Specifically, female and male subjects aged 18 to 60 were given standard intelligence tests and were randomly assigned to teams. Each

team was asked to solve one complex problem— and to complete several tasks, including decision making, brainstorming and visual puzzles—and given intelligence scores based on their performance. The teams that had members with higher IQs did not earn much higher scores, as was expected, whereas those that had more women did. The female factor seems to play a major role here.

The study also shows that women tend to be stronger at drawing people into conversation and what's more are better listeners, a great advantage for the entrepreneur who can better attune herself to customer needs and build more effective employee teams and partnerships. In fact Wooley & Malone (2011) point out that many women entrepreneurs described building their business as building a team. Anita Woolley, assistant professor at Carnegie Mellon University, asks: "What do you hear about great groups? Not that the members are all really smart, but that they listen to each other. They share criticism constructively. They have open minds. They're not autocratic." (Wooley & Malone 2011)

Another study conducted by a research team in the UK, after examining how men and women communicate, said men speak more words than women in a day, but have a weaker command of language in social situations. Men also use the same words repeatedly and pay unconvincing compliments. (Cowley 2011) Researchers found that men and women used similar language when conversation centered on issues such as current affairs or politics, however they differed widely when it came to social situations, social talk and chit-chat.

This study dispels the myth and gender stereotype that women are chatterboxes: "It is men who are more likely to talk for the sake of talking when engaged in social chit-chat by recycling their words with ritualistic and redundant language that doesn't contain new information," argues Manchester University researcher Geoffrey Beattie. (Cowley 2011) More analytically, for over a one week period researcher teams carried recording devices and transcribed 50 conversations, which were split between men and women in serious and social conversations. Subsequently, each conversation was given to five volunteers who read five different versions with every fifth word erased. The volunteers were asked to guess the missing word. According to the researchers, in social situations men used a few simple words and when it came to paying compliments the limited variety of their vocabulary became even more obvious. The study showed compliments from women had more detail, making them less predictable and more genuine while men were 90% predictable and frequently used words such as "really" and "nice". (Cowley 2011)

SOCIAL WOMEN ARE LISTENERS AND 'SHARERS'

The "Social Woman" (SheSpeaks 2011) wants to share and listen and not just use the Internet or social media as a megaphone to get her voice heard. According to the results of an online survey with 3,963 U.S. women, September 13-15, 2011, the top self-described trait of the social woman is that she listens. For example, the SheSpeaks (2011) findings show:

- 82% say they "listen carefully to the opinions of others", rather than debating or trying to convince others of their own views.

- Only 40% enjoy trying to change other people's minds.
- 86% are motivated to share when they find information that would be interesting to others.
- Women listen to their friends, gather information and then share it with other friends: online news being the top source of information (57%), followed by TV (50%), social media posts (49%) and email (48%).
- Their friends are the most influential people in their lives (83%), more than their spouse/partner (68%), professional experts (46%) or parents (44%).

Although social media is the talk of digital and marketing professionals, women of all demographic groups prefer the personal touch, sharing face-to-face with each other: 89% say they prefer personal contact, compared to 67% who like to share via social networking. Even though 84% say that "social media helps me feel more connected to others", the vast majority of women (93%) across all age groups agree that technology helps them connect with others (adding however that face-to-face relationships are more satisfying). One need point out here that over half (57%) agree that young people spend too much time connecting with others online or by texting, and that this is harmful for their future relationships. (SheSpeaks 2011)

The statistics of the SheSpeak's study show that women have high levels of engagement and that these social women are sharing content in multiple ways— i.e. facebook and smartphones are the fastest growing sharing mechanisms—mom's interact twice as much online with more people than non-moms (homemakers), etc. With regard to homemakers –women who work at home—they are active bloggers and engage online more consistently than moms. Almost two-thirds (63%) of homemakers say that: "Working at home (either as a homemaker or professional who works at home) makes me feel isolated sometimes" and (68%) started a blog in order to connect with others. SheSpeaks (2011) also shows that sharing for moms, who interact twice as much online than non-moms, is more about inspiring change, making a difference in the world, feeling good about themselves and wanting to make the world a better place for their children. For example,

- 60% of moms share because they want to inspire change (50% for homemakers/women with no children) and they believe they can make a difference by sharing (63% moms vs. 52% homemakers).
- Moms (51%) are more likely to have commented on "issues important to the local community" (51% moms vs. 38% homemakers).
- Sharing is part of who they are (72% vs. 63%).
- Want to help other people take advantage of promotions (86% vs. 77%) and comment more about shopping info in their blogs (25% vs. 19%) but less about lifestyle topics such as fashion/beauty (8% vs. 15%).
- Unlike homemakers, moms over-index in sociability and say they "seem to know everyone" (42% moms vs. 28% homemakers).
- Prefer to share by posting on social networking (73% moms vs. 57% homemakers).

WOMEN ENTREPRENEURS: WOMEN ARE CONCILIATORS AND BETTER TEAM MATES

By the year 2018 the demand for female management skills will rise dramatically! The UK Chartered Management Institute (CMI) predicts that women will be moving rapidly up the chain of command because their emotional-intelligence skills will be indispensable and valued. This trend will also accelerate due to the alarming talent shortage, reads a Time Specials[3] article which cited the CMI projections, according to which the work world in 2018 will be more fluid and virtual, and the demand for female management skills will be stronger than ever. The article entitled "Women Will Rule Business," by Claire Shipman and Katty Kay argues that "[Women are] consensus builders, conciliators and collaborators, and they employ what is called a transformational leadership style—heavily engaged, motivational, extremely well suited for the emerging, less hierarchical workplace." One need point out here that many studies confirm that businesses and companies that utilize or take advantage of their female talent pool have an important competitive advantage and greater success rates. For example, a 2008 McKinsey & Company study (CEW (2009) shows that companies with the most gender diverse management teams— namely that have women on board— have on an average higher business results, greater success with regard to profits and sustainability.

One must also call attention to the alarming predictions that if there is no drastic change in the female employment rate, demographic developments in Europe indicate that by the year 2036 there will be a drop of 24 million in the active workforce! Moreover, with regard to the European ICT sector, the Commission estimates that it will face a shortfall of 700,000 skilled workers by the year 2015, partly explained by a lack of women engineering and computing graduates. (Dr. Kamberidou & Fabry 2012)

Today, on a global level, there is a shortage of 1.2 million staff in the ICT sector. The lack of talent in the ICT industry and the small minority of women entering the job market in this field is a disadvantage for all. Women in Europe are drastically underrepresented across the board in ICT – in the academia, in education, in training programmes, in industry and in high level careers in this sector—so we need to address the factors that act as obstacles to inclusion and ensure that the opportunities are open to women on equal terms with men. If not addressed resolutely, the shortage of ICT-oriented women will have a great impact on future generations. Consequently, Europe's young people must be re-socialized to view ICT as an appealing or viable career option and field of study.

3. The Future of Work. Women will rule business. Time Special: http://www.time.com/time/specials/packages/article/0,28804,1898024_1898023_1898078,00.html (Thursday, May 14, 2009) Read more: http://www.time.com/time/specials/packages/article/0,28804,1898024_1898023_1898078,00.html #ixzz1xBIC94PA

In the global business sector this leadership gender gap seems to be widening as well, despite the fact that research— in the business sector in Europe and the US— shows that companies with women in leadership positions are more successful in regard to return on sales, equity and invested capital.[4] In the top European companies, from 2004-2008, women's participation in decision making positions has hardly risen. The number of women on the boards of European companies in 2004 was 8% and in 2008 it slightly increased to 8.5%, with the exception of the Scandinavian countries. (Dr. Kamberidou & Fabry 2012, CEW 2009)

With regard to entrepreneurship, women are also significantly underrepresented here as well, necessitating that we address this gender participation/engagement gap. According to European Commission (2012a) recent figures [Last update: 02/02/2012] women entrepreneurs in Europe make up only 30% of all entrepreneurs, an alarming decrease from 39.4% in 2010! The 2010 statistics showed that 39.4% women chose to be self-employed compared to 50.2% men and that women entrepreneurs made up only 34.4% of the EU's self-employed workforce.[5]

On the other hand, surveys conducted by the National Foundation of Women Business Owners (NFWBO) show that the women-owned firms that do compete in the global market stimulate growth and are focused on business expansion.[6] Women entrepreneurs have a significant impact on the economy, not only in their ability to create jobs for themselves but also in creating jobs for others.[7] Research also shows that women entrepreneurs are highly educated, use more high technology systems than their male counterparts and are an economic force to be reckoned with for sustainable economic recovery.

A study conducted for the Small Business Administration (SBA) titled Are Male and Female Entrepreneurs Really That Different?, Erin Kepler & Scott Shane (2007) observe that women entrepreneurs in the US are more likely to prioritize and minimize risk so that their business and personal lives work in harmony, whereas male entrepreneurs primarily focus on starting a business to make money and have higher business expectations. No doubt, the digital age has made it more feasible for risk-averse aspiring entrepreneurs of both genders to start a business. A wealth of low-risk opportunities and ventures like e-commerce, blogging, web-

4. Source: Women Leaders and Resilience: Perspectives from the C-suite, Accenture 2010. (http://newsroom.accenture.com/news/resilience+key+to+keeping+your+job+accenture+research+finds.htm)
5. Ibid. Also see figures in: "Women Entrepreneurs encouraged to take the plunge", 08/12/2010 http://ec.europa.eu/enterprise/newsroom/cf/itemlongdetail.cfm?displayType=news&lang=el&tpa_id=1020&item_id=4772&tk= Published 08/12/2010 (retrieved 26/2/2012).
6. See: International Entrepreneurship in: http://www.internationalentrepreneurship.com/european_entrepreneurship/greece_entrepreneur.asp (retrieved 12/2/2012)
7. "Women Entrepreneurs encouraged to take the plunge", 08/12/2010, in: http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/1675&format=HTML&aged=0&language=EN&guiLanguage=en

based services, cloud-based tools and virtual workforces further lower entry cost. Sure, the tendency to minimize risk can lead to higher success rates for female entrepreneurs, that is woman-owned businesses are more likely to have positive revenues, as the SBA study shows. However, Kepler & Shane (2007) argue that this could be described as risk-phobia which could also mean that women are more likely to place limits on the size of their business and are less likely pursue outside funding from investors to stimulate growth. In contrast however, as previously cited, NFWBO found the women-owned firms that do compete in the global market today stimulate growth and are focused on business expansion.

Moreover, key drivers for economic growth, innovation, employment and social integration are the 23 million small and medium-sized enterprises (SMEs) in the EU today which represent 99% of businesses. Consequently the European Commission's aim is to promote successful entrepreneurship and improve the business environment for SMEs, in order to allow them to realise their full potential in today's global economy. (European Commission 2012a)

EU NETWORKS FOR WOMEN ENTREPRENEURS

Europe needs more entrepreneurs and actions are being taken to overcome obstacles and change mindsets, especially in view of the fact that women entrepreneurs in Europe today make up only 30% of all entrepreneurs. Examples of these mindsets, namely social attitudes and stereotypes, are clearly displayed in a recent study conducted in Estonia. Tallinn University of Technology (TUT), being the forerunners in ICT fields and in initiating technologies such as Skype, decided to investigate possible scenarios on how female students at TUT see their input in entrepreneurship. Online questionnaires were sent out to female students in order to gain a more coherent understanding of gender and how it affects career choices and what could be done to improve the underrepresentation of girls/women in ICT. According to the results of the survey women do not want to start their own IT company, and the reasons given were: (1) Fear of new things, (2) unwillingness or lack of courage to be a leader, (3) fear of the responsibility, (4) work-life balance, (5) competing with men, and (6) professional competence. (WiTEC 2012).

In order to eliminate such obstacles and specifically this gender gap, the EC is promoting, supporting and encouraging female entrepreneurship. For example, the European Network of Mentors for Women Entrepreneurs was inaugurated in Warsaw, during a Polish Presidency event on 15 November 2011. This network has been enforcing and complementing the actions that started with the creation of the European Network of Female Entrepreneurship Ambassadors (ENFEA) in 2009 (European Commission 2012a).

The European Network of Mentors for Women Entrepreneurs is one of the actions proposed in the 2011 SMall Business Act (SBA) Review to promote female entrepreneurship in Europe in order to stimulate growth: "Europe's 2020 strategy and economy greatly rely on SMEs achieving their potential. The SBA is the EU policy framework aimed at strengthening SMEs so that they can grow and create

employment [...] Other measures on the SBA agenda include a mentoring scheme, and steps to promote entrepreneurship among women graduates". (European Commission 2012a) To date seventeen countries have joined the European Network of Mentors for Women Entrepreneurs: Belgium, Hungary, Greece, Cyprus, Ireland, Italy, the Netherlands, Romania, Slovakia, Slovenia, Spain, the United Kingdom, Albania, Turkey, the former Yugoslav Republic of Macedonia, Montenegro and Republic of Serbia.

This European Network of Mentors is extremely active. For example, only the Greek branch of the network has produced and included 104 business mentors and mentees. The national network "Business Mentors" –the Greek branch of the European Network of Mentors for Women Entrepreneurs— to date has 103 members and 51 mentors, even though they were only required to recruit 26 mentors and 52 women mentees. In other words one mentor per mentee. The Greek branch has already completed three training sessions for mentors (two in Athens and one in Thessaloniki in May 2012, is in the process of holding a series of dynamic webinars for the mentees. Additionally, other than coordinating and ensuring that these relationships run smoothly for the entire duration, one webinar session will be held for mentors every three months from September 2012 to August 2013.

A study undertaken by the Commission in 2008 on women innovators and entrepreneurship[8] confirms that the obstacles confronted by women in innovative entrepreneurship are of three types: (1) Contextual obstacles: educational choices, traditional views and stereotypes about women in science and innovation. (2) Economic obstacles: the innovation sector requires substantial investment and women are perceived as less credible financially than men. (3) Soft obstacles: lack of access to technical scientific and business networks, lack of business training, role models and entrepreneurship skills. Consequently, in order to overcome these obstacles, the Commission and Member States have been supporting and promoting women entrepreneurship in Europe with a series of activities and projects. In 2009 the European Commission helped establish the European Network of Female Entrepreneurship Ambassadors—launched in Stockholm during the Swedish Presidency. The second phase of the European Network of Female Entrepreneurship Ambassadors was inaugurated in 2010 during the networking event that was co-organised by the European Commission and the Belgian Presidency of the European Council, at which European Commission Vice-President Antonio Tajani, Commissioner for Industry and Entrepreneurship said: "Europe must build on its small businesses. Supporting women entrepreneurs is essential to stimulate growth since the entrepreneurial potential of women has not yet been fully exploited. Our initiative will play an important role in encouraging women to take the plunge and launching their own businesses which will be good for them and great for a sustainable economic recovery."[9]

8. Female entrepreneurship portal: http://ec.europa.eu/enterprise/policies/sme/promoting- entrepreneurship/women/portal/index_en.htm (retrieved 14/12/2010)
9. http://ec.europa.eu/enterprise/policies/sme/promotingentrepreneurship/women/index_en.htm

Today the Network is made up of around 270 entrepreneurs coming from 22 European countries. (European Commission 2012) The Female Entrepreneurship Ambassadors highlight and focus on the role that women can play in creating jobs and promoting competitiveness. Specifically, by testifying to their experience in schools, at universities and in the media, these Ambassadors serve as role models and mentors inspiring women to have an independent career. Since the establishment of the European Network of Female Entrepreneurship Ambassadors many initiatives and programs have been implemented, such as (1) the establishment of a micro-credit, mentoring, coaching and grants programmes targeting female entrepreneurs in Spain. (2) the establishment of a specific mentoring programmes in Latvia. (3) Romania has been organizing women entrepreneurs' days. (4) The UK 'Women's Enterprise Ambassadors' and a "Flying Start" programme encouraging entrepreneurship among women graduates and (5) the previously mentioned European Network of Mentors for Women Entrepreneurs inaugurated in Poland on 15 November 2011.

TIPS FROM WOMEN ENTREPRENEURS

Today women-owned businesses are on the rise, thanks to the Internet and social media in particular. Social networking is allowing women to inexpensively reach many target groups. What could be better for marketing a business? With so many active women online (social women)—with such an expanding and new target market—it makes sense for women business owners, to market to them via social networking. Additionally, social networking also takes advantage of many women's so called natural strengths which were examined in this paper, such as "listening", communication, sharing, support forums, creating relationships, community building, and support. Isn't this what social networking is all about? Groups, forums and even entire social networking sites that are created by women are perfect places for women entrepreneurs to market their business! Anyone involved in marketing online, can no longer afford to ignore social media. It's all about gaining a steady momentum: branding yourself, building a platform and enticing people to be interested in what you have to say. When it comes to social media marketing there are so many choices! So how do you decide which social media outlets are right for you? Nellie Akalp (2010) argues you need to hear what your targeted community is saying so that you can craft a value proposition that will speak to them, and women are good listerners!

The International Association of Women Entrepreneurs (IAWEO 2012) found over 40 women entrepreneurs to share their secrets to social media marketing and here are some of them:

1. Stay Specific: Target customers and focus on information that builds customer trust. This means that your social media is interested in your customer and not just on making a sales pitch.
2. Hire a social media expert/manager so you can concentrate on your business.
3. Practice makes perfect: navigate, explore, tweet new ideas, products, etc.
4. Include a personal touch: always send a thank you for connecting to a new 'friend', take a moment to look over their page and find something you have in common.

Olga Stavropoulou, Founder, co-Owner and Managing Director of Militos Emerging Technologies & Services (www.militos.org), as well as Coordinator of the Greek branch of the European Network of Mentors for Women Entrepreneurs recommends:

- Your content must add value to your readers!
- Refrain from over posting; avoid being one of those who exhaust social media friends with multiple postings.
- Take the time to add your own 'catchy' title than just posting a link.
- Develop and apply an internal social media policy to guide and facilitate your employees on how and when social media is used.
- Engage and interact with your social media friends and work on making your relationship stronger.
- Free your social sharing potential. Be creative, to the point, useful and share your values, goals, achievements with your readers.
- Set the limits up to the point you break the limits. Social media can take you on a global ride, and that requires smart strategy, planning and action.
- Be your'biz'self! Social media can eventually reveal fakes and reward true entrepreneurs.

Stacy Karacostas (2012), a practical marketing expert, with five previous businesses under her belt, recommends:

- Hiring a virtual assistant. If you don't understand the technology hire someone to handle the technology side while you focus on your business strategy and content.
- If you feel uncomfortable about showing off your expertise or putting yourself all out in the social media, then look at social networking as a way to reach and help more people and let other women do the bragging for you once they have discovered you.
- Setting a social networking strategy, complete with goals, deadlines, specific limits on the time you're going to spend online. This is absolutely necessary as women entrepreneurs do a lot of multi-tasking between the business, kids, and relationships, and social networking can easily absorb all your time.
- Sharing referrals and connecting your favorite people and businesses together.
- Finding online groups, forums and even entire social networking sites that are created by women, for women since these usually offer support, connections, information, marketing opportunities, and more.

The Center for Women and Enterprise in partnership with Babson's Center for Women's Leadership hosted a panel with three successful women entrepreneurs (Akalp 2012) at which the following points were made:

- Start slow, listen to the chatter in the social media, spend months collecting information in your area of interest/business, and don't worry about the competition since more often than not, you end up partnering with them to everyone's benefit.
- Whatever you post on social media should add value to the reader's experience and encourage them to come back to you for more. Once you or your business has been 'recognized' in the social media, they will be more apt to respond to traditional outreaches through e-mail.
- Allocate your resources and time (yours and your staff's) for social media promotion. Use the tools that can help you manage and optimize your time in the social media world: Laterbro.com, hootsuite.com, and cotweent.com etc.

- Create a circular flow of communication through your use of social media that ultimately and always brings your clients back to your website.
- Decide on your 'framework' or 'brand' in the social media outlets: some social media are more relevant to certain aspects of your business development than others.
- Social media compliments marketing efforts, for example Twitter is great for 'trial and error' in the social media world. Whatever you put up there only lasts about 15 minutes, so you can test things out and not to worry about it hanging out in cyberspace to haunt you.
- Learn to use the analytical tools that help you determine the impact your social media networking is having on your business.

Natalie Sisson (2010), an entrepreneur coach who today [2012] calls herself a Suitcase Entrepreneur, with a thriving online business using social media offers the following tips:

- Use social media as an integrated part of your business marketing approach.
- Connect with a diverse range of people from all around the world, people you may never have even discovered or had the chance to contact without the social media.
- Profile a few successful women

CONCLUDING REMARKS-RECOMMENDATIONS: INTEGRATING A GENDER PERSPECTIVE

The main goal of integrating a gender perspective is that of gender equity/social equality for both women and men. Gender integration refers to the process of assessing and reassessing the implications for both women and men of any program and action plan at all levels: social, economic and political. This requires gender-specific interventions, policies and practices that may target exclusively women or interventions that target men exclusively, or even men and women together. One need point out here that gender issues do not concern women only, as men also have a gender and are subject to gender stereotyping, distinctive social expectations, social inequalities and exclusions. For example, male migrant groups or ethnic minority entrepreneurs, another important pool of entrepreneurs in Europe, also confront exclusionary practices and obstacles: discrimination, language barriers, limited access to funding, support services, as well as inadequate business, management and marketing skills. (Dr. Kamberidou 2010) Another example of a gender issue which concerns men exclusively are male athletes who belong to diverse ethnic groups. Although many of the world's finest athletes and players are ethnic minorities or migrants, they are still under-represented in non-playing positions, in sport governing bodies, in positions of authority, etc. In other words integrating a gender perspective means identifying and eliminating systemic or unconscious bias and discrimination from structures and governing bodies, looking at the data on recruitment, promoting new role models and mentorship programs, developing and applying effective policies, etc. It requires shifts in organisational and institutional practices, attitudes or ways of thinking and in resource allocations and goals. In fact, the goal of mainstreaming gender equality is to transform exclusionary or unequal social and institutional structures into equal and just structures for both women and men. It entails ensuring a gender balance, increasing the talent pool and enabling

everyone to realize their full potential. (Dr. Kamberidou & Fabry 2012)

One need reiterate here that gender is never detached or separate from diversities that define us as human beings, such as ethnicity, race, religion, disability, age, etc. Integrating a gender perspective means increasing the number of discriminated social groups (ethnic minorities, migrants and women) into power positions, encouraging and supporting inclusivity, appointing diversity officers, raising the profile of role models and mentors, promoting media campaigns against sexism, racism, etc. It means reassessing changing identities, stereotypes and gender relations and re-examining changing attitudes and social expectations. We already have all the necessary research and analyses. Gaining a thorough understanding of the wastage of talent, including the talent shortages—trends, rates and differences—is essential in order to set realistic targets and integrate the gender dimension into the equation. Mainstreaming a gender perspective in social spaces (entrepreneurship, business sector, IT, Information Society, Education, etc.) means incorporating the human dimension, promoting diversity so as to change mindsets and stereotypes, especially as far as women are concerned. Research findings show greater exclusionary practices and underrepresentation with regard to women, consequently enabling everyone to realize their full potential requires bridging major social inequality gaps: the gender participation gap, the gender pay gap and the gender leadership gap. In other words, preventing this wastage of talent and in particular eliminating gender devaluation processes: the subtle processes by which women's engagement and contributions are minimized, undervalued or devalued in the so-called male fields. It requires re-addressing best-practices that will eliminate the leaky pipeline, break the glass ceiling and get more women to ride up the glass escalator.

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DIGITAL SECURITY CONCERNS & THREATS FACING WOMEN ENTREPRENEURS

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ABSTRACT

Women represent the main economic force in most developing countries. As economies become more and more information-driven, the issues of women's access to and use of Information & Communication Technologies (ICTs) are growing in importance for both developed and developing economies. Some claim that women are rather technophobic and that men are much better users of digital tools, while others argue that women enthusiastically embrace digital communication. The ease with which information and communication technologies can transmit and disseminate information for development is well recognized. But women's access to ICTs cannot be assumed to occur "naturally" when gender-blind approaches and technologies are implemented. As a result of profound, gendered applications and implications of ICTs in employment, education, training and other areas of life, women need encouragement and support to take their rightful place in the information revolution. Research has demonstrated that security and privacy in the use of ICT, especially in Internet, are the most important thematic areas of gender concerns which include freedom of expression, privacy of communication, secure online spaces where vulnerable groups such as women feel unsafe from harassment. The main concern that discourages women to enter dynamically into e-business market is the disclosure of their personal information compared with men who appear willing to sacrifice their privacy at the altar of profit of electronic commerce. The aim of this research is to present digital threats and risks facing women entrepreneurs daily while interacting with online communities, secondly, to study security gaps that the privacy policies of popular pages contain and last but not least to give proof that women justifiably worry about their security and privacy when using online communities and virtual worlds, like the social networking sites. It is certain that these pages are insufficient regarding the privacy of their users due to the lack of adequate security measures letting personal data exposed and available to others.

Keywords: *ICT, Women Entrepreneurship, e-Business, Digital Threats, Security, Privacy*

INTRODUCTION

During the 1990s, researchers were quick to observe that women tend to be latecomers to the digital age. As a consequence, the new technology was popularly portrayed as a male domain. Bimber concluded that the gap in ICT usage between women and men is the product of both so-

cioeconomic differences and some combination of underlying, gender-specific effects.

As more statistics became available and Internet and mobile telephony penetration rates began to rise, women started to catch up in many developed countries. In the United States, most new users were women around the year 2000. Gender differences remained, but were smaller while years passed and mainly concentrated on marginalized groups, such as ethnic minorities. However, once online, women remained less frequent and less intense users of the Internet. [18,19]

Nowadays, privacy, security and Internet rights are important thematic areas for women. Women's concerns that include having secure online spaces where they can feel safe from harassment, enjoy freedom of expression and privacy of communication, and are protected from electronic snooping. A corollary of this is the need for campaigns against ICT legislation that can threaten human rights. While many developing countries are grappling with basic access and IT infrastructure issues, some countries in the global North are now defining the basic rights framework for Internet use and governance. [3, 21]

The study is mainly based on the fact that the majority of women are not active in the area of e-business due to the risks posed by digital threats. It is generally accepted that engagement with social networks is obligatory for the success of an e-business activity. It is no coincidence that the most successful e-entrepreneurs acknowledged that never did they take advantage of the social networking use, they will not have noticed such large percentages of profits. Despite the fact that social networking pages look so user-friendly, women once again show reluctance to use them as a tool in their work.

Accordingly, the rest of the paper is structured as follows: Section 2 discusses security and privacy issues concerning women e-entrepreneurs. Section 3 presents the most important digital threats that limit the female e-business activities . Section 3.1 presents a detailed description of the threats that tend to affect and harm the sensitive women 's nature. Section 3.2 analyses the e-business risks through the social networking use. Section 4 presents the results obtained by statistics that approve the absence of women in e-entrepreneurship. Section 5 presents the recommendations from the results and the suggested policies for safer systems with the interaction of fundamental security requirements. Finally, the paper is concluded in Section 6.

WOMEN E-ENTREPRENEURS' CONCERNS

Information and communication technologies could give a major boost to the economic, political and social empowerment of women, and the promotion of gender equality. Information technology, applications and the use of e-services have changed dramatically in the recent past, providing women entrepreneurs and others, greater opportunities for personal growth and business success. [13]

Second-generation Internet software, referred to as Web 2.0, puts the user in control. Internet search programs now allow users to create, upload and use their own vertical search engines. Users may search within websites and use feeds, such as from particular newspapers.

Local search refers to the ability to recall past search entries. A business can incorporate such valuable tools as "click to call", maps, pay per call, pay per click and coupons in its website. Increasingly, Internet searches are conducted with mobile devices and a business should customize its information accordingly. ICTs allow business persons to manage virtual teams spread around the globe by using e-mail, messenger, telephones, "live meeting" and "sharepoint". A business woman's office becomes where her computer is. [20]

Generally, women have less access than men to ICT facilities where they exist. Numerous invisible barriers limit women's and girls' participation in the Information Society. But women's access to ICTs is constrained by factors that go beyond issues of technological infrastructure and socio-economic environment. Digital privacy remains a cross-cutting element in shaping (and in this case, limiting) the capacity of women and men to participate on equal terms in the Information Society.

One of the more pervasive but intractable problems is "technophobia," or fear of technology due to the lack of e-security. Women, either as entrepreneurs or as customers, hesitate to develop e-business activities. More specifically, the main issues of concern that act as barriers to the increased uptake of information technology and e-commerce including also the social networking are the following:

SECURITY ISSUES

Ensuring security of payments and privacy of online transactions is key to the widespread acceptance and adoption of e-commerce. While the appropriate policies are in place to facilitate e-commerce, lack of trust is still a barrier to using the Internet to make online transactions.

PRIVACY ISSUES

While security is commonly used as the catch-all word for many different reasons why individuals and firms do not engage in extensive e-commerce and use of Internet-based technologies, there are other related reasons and unresolved issues, such as tax evasion, privacy and anonymity, fraud adjudication, and legal liability on credit cards. [3]

In many countries, cash is preferred not only for security reasons but also because of a desire for anonymity on the part of those engaged in tax evasion or those who simply do not want others to know where they are spending their money. Others worry that there is lack of legal protection against fraud (i.e., there is no provision for adjudicating fraud and there may be no legal limit on liability, say, for a lost or stolen credit card). It is necessary to distinguish these concerns from the general security concerns (i.e., transaction privacy, protection and security) since they may not be addressed by the employment of an effective encryption method (or other security measure).

The "leaky pipeline" phenomenon means that fewer women enter into the e-business fields, limiting the number of women entrepreneurs in research and development, and at senior positions in the ICT arena. [14]

DIGITAL THREATS

The Internet has introduced new risks alongside the promise of enhanced cross-boundary communication. In particular, it has increased the opportunities for surveillance of interactions be-

tween targeted groups and individuals, and for harassment. According to research, there is a "Top 10" for the most frequent in appearance and most dangerous e-Business Risks and Social Networking Threats. These are the following: [4,5,10]

- **Social networking worms:**
  Social networking worms include Koobface, which has become, according to researchers, "the largest Web 2.0 botnet." While a multi-faceted threat like Koobface challenges the definition of "worm," it is specifically designed to propagate across social networks (e.g., Facebook, mySpace, Twitter, hi5, Friendster and Bebo), enlist more machines into its botnet, and hijack more accounts to send more spam to enlist more machines. All the while making money with the usual botnet business, including scareware and Russian dating services.

- **Phishing bait**
  Phishing refers to the effort of posting personal information, usually financial in nature relating to bank accounts and credit cards, using a false pretext as bait. Phishing attempts typically send a spam email.

- **Trojans**
  E-business while interacting as a part of the Social networks has become a great vector for Trojans. Two characterizing examples are the following:
  1. Zeus is a potent and popular banking Trojan that has been given new life by social networks. There have been several recent high-profile thefts blamed on Zeus, notably the Duanesburg Central School district in New York State late in 2009.
  2. URL Zone is a similar banking Trojan, but even smarter, it can calculate the value of the victim's accounts to help decide the priority for the thief.

- **Data leaks**
  Online communities and virtual worlds are all about sharing. Unfortunately, many users share a bit too much about the organization like projects, products, financials, organizational changes, scandals, or other sensitive information. Even spouses sometimes overshare how much their significant other is working late on top-secret project, and a few too many of the details associated with said project. The resulting issues include the embarrassing, the damaging and the legal. [8]

- **Shortened links**
  People use URL shortening services (e.g., bit.ly and tinyurl) to fit long URLs into tight spaces. They also do a nice job of obfuscating the link so it isn't immediately apparent to victims that they're clicking on a malware install, not a CNN video. These shortened links are easy to use and ubiquitous. Many of the Twitter clients will automatically shorten any links.

- **Botnets**
  Late last year, security researchers uncovered Twitter business accounts being used as a command and control channel for a few botnets. The standard command and control channel is IRC, but some have used other applications -- P2P file sharing in the case of Storm -- and now, cleverly, Twitter. Twitter is shutting these accounts down, but given the ease of access of infected machines to Twitter, this will continue.

- **Advanced persistent threats (APT)**
  One of the key elements of advanced persistent threats (APT) is the variety of intelligence gathering techniques to access sensitive information of very important people (e.g., executives, officers, high-net-worth individuals), for whom online communities and virtual worlds are used as occupational tools. Information disclosed by APTs can be a treasure trove of data. Perpetrators of APTs use this information to further their threats -- placing more intelligence gathering (e.g., malware, trojans), and then gaining access to sensitive systems. So while not directly related to APTs, online communities, even the social networks are a data source. Less exotic, but no less important to individuals is the fact that information on your whereabouts and activities can give more run-of-the-mill criminals an opportunity.

- **Cross-Site Request Forgery (CSRF)**
  While it isn't a specific kind of threat, CSRF attacks exploit the trust of any online networking application has in a logged-in user's browser. So as long as the network application isn't checking the referrer header, it's easy for an attack to "share" an image in a user's event stream that other users might click on to catch/spread the attack.

- **Impersonation**
  E-business and social network accounts of several prominent individuals have been hacked (most recently, a handful of British politicians). Furthermore, several impersonators have gathered hundreds and thousands of followers on Twitter -- and then embarrassed the folks they impersonate (e.g., CNN, Jonathan Ive, Steve Wozniak, and the Dalai Lama), or worse. Twitter will now shut down impersonators attempting to smear their victims, but at Twitter's discretion. Admittedly, most of the impersonators aren't distributing malware, but some of the hacked accounts certainly have (e.g. Guy Kawasaki).

- **Trust**
  The common thread across almost all of these threats is the tremendous amount of trust users have in online communities' applications. Like e-mail, when it hit the mainstream, or instant messaging when it became ubiquitous, people trust links, pictures, videos and executables when they come from "friends," until they get burned a few times.

The European Network and Information Security Agency (ENISA) issued a statement reiterating the main points that users of online communities have to keep in mind, and propose policies to be followed by the competent institutions to tackle them. The most important are listed below: [2,8]

PORNOGRAPHY, TRAFFICKING, VIOLENCE AGAINST WOMEN &CENSORSHIP

Another justification for interception of Internet communications often presented to the general public is that it is needed to combat the sexual exploitation of women and children, and to prove that e-entrepreneurship is not a masculine issue. It is commonly known that there is no gender divide in e-business and phenomena like the following that aim to harm women physically, psychologically and mentally should stop appearing. [7,17]

The picture that emerges from most analyses of new information and communication content is of a masculine rhetoric, and a set of representa-

tions which are frequently sexualized and often sexist. Pornography, e-mail harassment, "flaming" (abusive or obscene language), and cyberstalking are well documented. It is estimated that 10 percent of sales via the Internet are of a sexual nature, whether in the form of books, video-clips, photographs, online interviews, or other items. New technical innovations facilitate the sexual exploitation of women and children because they enable people easily to buy, sell and exchange millions of images and videos of sexual exploitation of women and children. These technologies enable sexual predators to harm or exploit women and children efficiently, and anonymously. As a result of the huge market on the web for pornography and the competition among sites, pornographic images have become rougher, more violent, and degrading. Affordable access to global communications technologies allows users to carry out these activities in the privacy of their homes.

Even more disturbing is the use of the Internet as a tool in the prostitution and trafficking of women. In 1995 an estimated 1.8 million women and girls were victims of illegal trafficking, and the numbers are growing. The Internet is used in multiple ways to promote and engage in the sexual exploitation and trafficking of women. Pimps use the Internet to advertise prostitution tours to men from industrialized countries. The men then travel to poorer countries to meet and buy girls and women in prostitution. Traffickers recruiting women from the Baltic States use the Web to post advertisements for unlikely jobs in Western Europe (such as waitress or nanny). Information on where and how to find girls and women in prostitution in cities all over the world is posted on commercial Web sites and non-commercial newsgroups. In 2001, the Council of Europe established a working group to study the impact of new information technologies on trafficking in human beings for the purpose of sexual exploitation.

There are numerous organizations working on the issues of women's trafficking and have done much to raise concern over the use of the Internet for trafficking women and children, and the explosion of pornography on the Internet. While recognizing that traffickers and pornographers have moved their businesses to the Internet, women's organizations have also been aware of the dilemma of calling for government measures to curb this.

One of the fiercest debates in the area of Internet Rights regards the issue of freedom of expression and censorship. Some organizations have used the presence of pornography on the Internet to call for stricter policies for monitoring and censoring content on the Internet, including the development of software devices that would track down the creators and consumers of pornographic materials. Other women's organizations have been at the forefront of pointing out the danger of inviting censorship measures that could very easily be extended to other content areas, and limit freedom of expression far beyond the realms of pornography and trafficking. Legislation can be interpreted widely, leaving it open for states to decide what they would consider "illegal" or "harmful practices."

Above all else, women should be informed, made aware and included in the discussions and debates taking place around these trends, and consulted in the development of any policies and practices that are advocated by state agencies and other bodies.

SOCIAL ENGINEERING

What is mentioned before is the immediate relationship that connects the e-entrepreneurship with social networking. It is generally approved that every successful e-entrepreneur should be a well-informed social networking user. Once again, it is observed that women using social networking sites as a tool for their e-business promotion are willing to disclose and share much less information than men do because of their digital privacy concerns.

The term Social Engineering is referred to a specific method of electronic attack, which is characterized as the biggest threat for the network security. The official definition says that Social engineering is the action of oral guidance of individuals with aim to the detachment of information. Even if it is similar to the subterfuge or the simple fraud, the term is mainly connected with the deceit of individuals aiming at the detachment of confidential information that is essential for the access in some calculating system. Usually the one that applies him does not come never face to face with the individual that deceits or induces. [6,9,11]

The steps that an intruder follows in order to achieve intruding in a network of computers with the methods of social engineering, are the following:

- He approaches in some way an individual who has permitted access in the network.
- He presents himself as a confident individual.
- He tries to extract information from the individual that approached, that places at risk the safety of network.

THE ABSENCE OF WOMEN IN E-BUSINESS

The gender distribution of ICT access is also skewed. ICT access by women tends to lag that of men, but the gaps are generally declining. However the gaps remain large in older age groups, and in areas of newer technologies. [12, 15, 16, 21]

The following figure looks at the presence of women in occupations that use ICTs. In most countries, women account for between 30% and 50% of employment in ICT-skilled employment according to the broad, ICT-using definition (Figure 1).

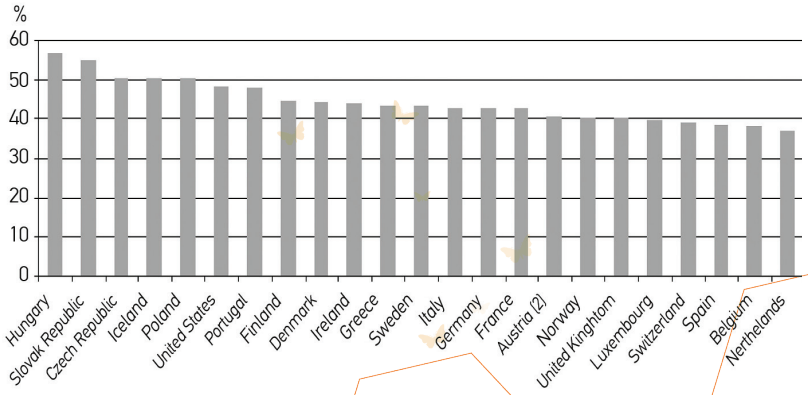

Figure 1: *Share of women in ICT-using occupation (selected countries)*

The following figure presents the number of e-entrepreneurs as a percentage of the total employed population, by gender.

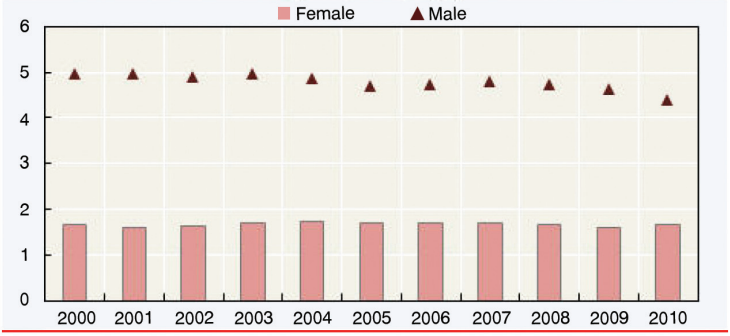

Figure 2: *E-Entrepreneurship*

SYSTEM SECURITY REQUIREMENTS

The fundamental safety requirements to a system are the confidentiality, the integrity of data, as well as the availability of the system. The following figure presents the interaction of fundamental security requirements in a system. [1]

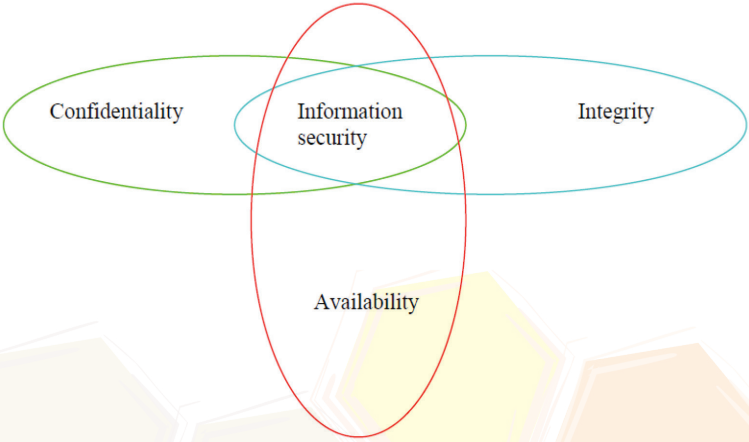

Figure 3: *Interaction of fundamental security requirements in a system*

Confidentiality means prevention of unauthorized disclosure of information. Therefore, the data used for the delivery of services should be disclosed only to authorised persons. Integrity is the requirement of the unauthorized modification and deletion of data, as well as creating new data, i.e. to ensure the validity, accuracy and completeness of the data during the import phase, treatment and outcome of treatment. Finally, the availability is the property of a system to offer services that are accessible and without undue delay. This parameter is very important in systems since the majority of these are real-time systems (real-time systems), since the services are changing and improving, while users are increasing continuously.

CONCLUSION

Never before has there been a greater need for e-entrepreneurs to protect their privacy and anonymity. With the rapid development of the ICTs, the computer systems contain more and more sensitive user data, and security requirements are growing explosively. For this reason, it is necessary to develop techniques to safeguard privacy, particularly for space-time data. Many questions arise about the way they manage their systems to orbit the data, the methods and the architectures of the systems that should be implemented to protect them, and how to combine all these methods in order to improve the applications and offer better services.

Summing up, this article argues for a re-thinking about women and ICT usage with prerequisite course the improvement of telecommunications-information systems providing greater security and ensure privacy that truly allow girls and women to become equal members of an information-digital-network- society.

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WOMEN IN THE FIELDS OF SCIENCES AND TECHNOLOGY

CONCEIVING, EXPLORING & EXPLOITING INNOVATIVE IDEAS
FROM WASTE COOKING OIL TO DIESEL

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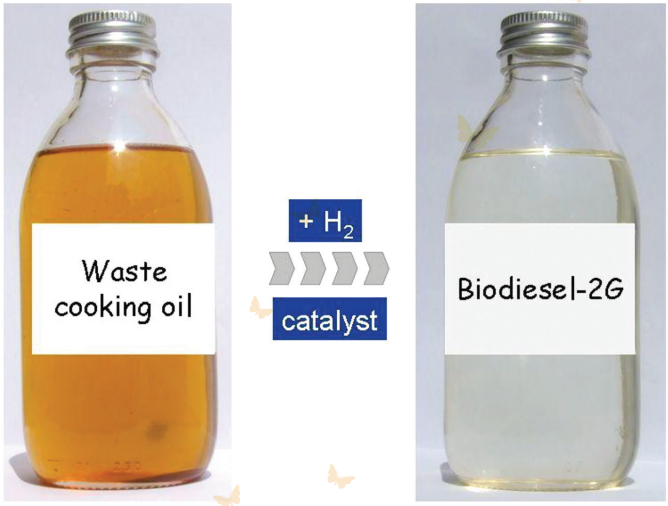

ABSTRACT

Conceiving, exploring and exploiting new ideas are the basis for technological creativity and innovation. By far the most important step is the conception of a new idea having the potential to be transformed to a successful business solution. Nevertheless, the exploration of a new idea and its subsequent exploitation require both recourses and systematic planning in order to promote a sustainable entrepreneurship. An innovative idea of a new green technology for producing diesel from residual feedstocks was conceived and developed in the Centre for Research and Technology Hellas (CERTH). The main concept of this technology is the innovative exploitation of waste

cooking oil, which is abundant in Greece and other Mediterranean countries. The technology is based on catalytic hydrotreatment, a traditional petroleum process that is widely employed to upgrade petroleum products. The catalytic hydrotreatment of waste cooking oil was explored by the support of the European Program LIFE+ (LIFE08 ENV/GR/000569), which funded both the Research and Development activities but also the demonstration of the technology on a larger scale. In particular a large quantity of waste cooking oil was collected and converted to the new diesel, in a sufficient quantity to fuel a garbage truck for a few months, demonstrating the new technology (www.biofuels2g.gr). The new low-carbon technology offers a new diesel of increased sustainability, superior quality, better fuel consumption (lit/km) and lower emissions. Furthermore, based on conservative estimations of the available waste cooking oil quantities in Greece and due to the high conversion yields of the proposed technology, it is estimated that waste cooking oil can satisfy ~9.5% of the national demand in diesel fuel. Due to all the aforementioned advantages, this technology was granted the 2nd innovation award in the "Greece Innovates" competition organized by Eurobank EFG and Hellenic Federation of Enterprises in July 2011. Towards the exploitation of this technology, the incorporation of waste cooking oil to an existing production process of fossil fuels is explored with the support of the European Commission and the Greek Government under the National Funding Scheme SYNERGASIA via the project SustainDiesel-09SYN-32-328. This joint project with Hellenic Petroleum Group exhibits strong potential for getting scaled-up to industrial scale, thus promoting a green technology into the energy sector.

Keywords: *Waste cooking oil; hydroprocessing; biofuels; biodiesel*

AN INTRODUCTION TO CREATIVITY AND INNOVATION

The concept of creativity refers to the intention or creation or materialization of a new concept/idea/thing that has a certain value. Normally creativity is associated with artwork and literary work but is also linked with technology as well. A related concept is that of innovation which is mostly associated with technology as refers to the creation of better and more effective products, services, technologies etc. Nevertheless, it is often difficult to put a boundary between the two concepts or to even associate a new product with either creativity or innovation. Both creativity and innovation, however, share the same three distinctive steps: conception, exploration and exploitation of a new idea, in order to evolve and materialize an initial idea/concept into a higher added value result.

The first and by far most important step towards creativity and innovation is the conception of a new idea. If there is no new idea, there cannot be any innovation or breakthrough. Furthermore, the idea has to be not only new/fresh but also useful. In order for an idea to be both fresh and useful, prior knowledge of problems that need to be solved as well as possible solutions is required. Even though there are no significant resources required for the conception of a new idea, this step contributes largely to the overall innovation/creation, as shown in Figure 1.

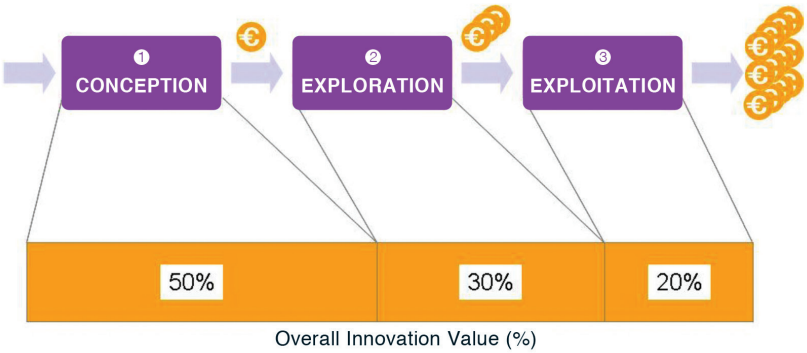

Figure 1. *Conception, exploration and exploitation steps and their corresponding contribution to the overall innovation value*

The second and very important step is the exploration of the idea. This step shows whether the original idea can or cannot "work". Unlike the first step of conceiving the idea, this second step requires significant effort and resources. An idea can be explored by either private funding (if it's a corporate-related idea) or by employing EU and/or national funding. In either case the funding will provide the necessary resources (manpower, infrastructure, consumables etc) for exploring the idea further. The idea exploration includes research/studies related to the proof-of-concept, experimentation, scaling-up to industrial/commercial scale, techno-economic feasibility etc. It is estimated that the exploration step is the second in importance step (Figure 1) in the overall innovation value from conceiving to materializing a new idea. Nevertheless, it should be noted that the more an idea is explored, the less the risks of failure during the third and last step of exploitation. Therefore, significant effort should be foreseen and dedicated in order to thoroughly explore the initial ideal.

The third and last step towards innovation is the exploitation of the idea towards its implementation. The exploitation step will allow the materialization of the original idea into a successful business step, utilizing the findings of the exploration step. The idea exploitation ensures the competitiveness of the final product/service/technology. In order for the exploitation step to be successful, careful business planning as well as technology licensing and patents are required. Even though this last step is the most straight-forward step and with potential to provide high profit margins, its value is the lowest as related to the overall innovation value, as shown in Figure 1, as compared to the preceding conception and exploration steps.

WASTE COOKING OIL TO BIODIESEL: A CASE STUDY OF FEMALE CREATIVITY AND INNOVATION

The three steps towards innovation were applied for the research and development of a new technology for producing alternative fuels. The idea was conceived, explored and exploited aiming to get commercialized and promote environmental and economic benefits. In the following paragraphs, these three steps are presented in detail as a case study for creativity and innovation, aiming to motivate young female researchers towards creativity and innovation.

CONCEIVING THE IDEA

The exploration of alternative fuels was motivated by the two well-known worldwide problems of world oil reserves depletion and large contribution of transportation fuels to climate change. In fact it has been estimated that transportation energy accounts for ~40% of CO2 emissions [1]. In Europe, as the diesel demand is continuously growing, the alternative diesel market which mostly consists of FAME (Fatty Acid Methyl Esters) biodiesel from plant oils grew rapidly [2,3]. Even though FAME biodiesel has shown potential of reducing the net carbon dioxide emissions, its commercialization is limited by the increased production cost of the raw material (i.e. vegetable oils)[4] as compared to fossil diesel.

The land competition between the energy dedicated plants, i.e., energy crops, and the food crops has led to the increase of food market prices and the inevitable "food versus fuel" debate. As a result, new alternative fuel technologies have emerged depending on residual biomass feedstock, including agricultural waste products (eg. stems, leaves) and municipal wastes such as organic solids and waste cooking oils (WCO). In fact, WCO disposal is particularly problematic as one liter of WCO could contaminate over one million liters of water, which is on average the amount of water that is utilized by one person for 14 years.

Interestingly however, irrespectively of the source/type, biomass is generally not suitable for energy production. The oxygenated compounds (eg. lipids, acids, ketones, etc) contained in all biomass types induce oxidation, acidification and even polymerization problems, while the water content gives corrosion problems to resulting fuels' application. In order for the biomass to be converted to a suitable energy source, both oxygen and water should be removed.

Catalytic hydrotreatment is a key petroleum technology available in almost all refineries, as it is employed for product upgrading. As one of its targeted processes is the removal of unwanted heteroatoms (sulfur, nitrogen, metals), it was envisioned as a possible process for removing oxygen. As a result the idea emerged of evaluating the catalytic hydrotreatment as a potential technology for upgrading the WCO residual biomass feedstock into biofuels to remove oxygen compounds and water. However, as the catalytic hydrotreatment was never applied to WCO, the technology had to be explored in order to evaluate whether it is suitable for biofuels production.

EXPLORING THE IDEA

The catalytic hydrotreatment of WCO technology was explored in the hydroprocessing pi-

lot plants of the Laboratory of Environmental Fuels and Hydrocarbons (LEFH) of the Centre for Research and Technology Hellas (CERTH). As there was no prior literature/know-how on such technology, there were significant challenges that had to be faced.

Firstly there was no hydrotreating catalyst specifically designed for WCO. In classical catalytic hydrotreatment applications there are particular catalysts designed and developed to operate for different feedstock types, i.e., with different characteristics and for different process targets, for example maximizing diesel yield, or maximizing gasoline yield or for isomerization etc. As a result there was significant effort towards assessing commercial catalysts [5] that could potentially be utilized for such application. After a series of dedicated experiments, the best hydrotreating catalyst was selected based on its effectiveness in maximizing diesel yield (desired product) while maintaining its quality. Secondly, the operating parameters of hydrotreating WCO (reaction temperature, pressure, liquid hourly space velocity, and hydrogen-to-WCO ratio) had to be optimized. A series of experiments were conducted in order to evaluate the optimal operating parameters that will maximize the desired product (biodiesel) yield [6-8].

The research experiments showed that catalytic hydrotreatment is an effective technology for converting WCO into diesel molecules. This is readily shown in Figure 1, where the WCO and hydrotreated WCO products are compared via their distillation curve, which in essence shows the size distribution of the contained molecules. The WCO molecules are too large/heavy to be used as diesel fuel. However, after hydrotreating, the product includes over 90% of molecules which are suitable for diesel fuel. This increased conversion also renders the catalytic hydrotreatment technology as a promising technology from an economic prospective as well.

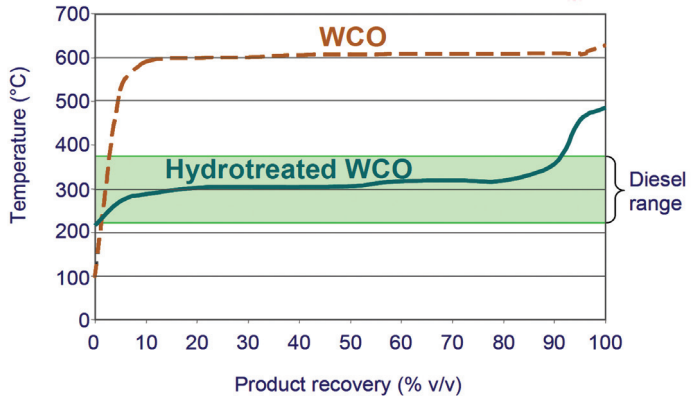

Figure 1. *Comparison of distillation curve of waste cooking oil (WCO) and hydrotreated WCO. The green band indicates the distillation range of diesel-like molecules (target)*

Once this technology appeared as a promising alternative conversion pathway of a residual feedstock such as WCO into biodiesel, it was further explored in larger scale, aiming to demonstrate its effectiveness. This was achieved via the BIOFUELS-2G project [9]. This project involved the design, development and demonstration of the new technology for the production of 2nd generation biodiesel utilizing 100% WCO. The project began on January 1st, 2010 and had a total duration of 36 months. The project participants included the Centre for Research and Technology Hellas (CERTH) as a coordinator, the Aristotle University of Thessaloniki (AUTH), the Municipality of Thessaloniki and the Association of Restaurant Owners of Thessaloniki. The total budget of the project was 1.4 million € and it is co-funded by the LIFE+ Programme of the European Union by 50%.

The environmental nature of this project abided by its target to mitigate climate change and promote a new sustainable technology for the production of biofuels from waste. The environmental character of the technology was also enhanced by incorporating hydrogen which was produced by solar energy, i.e., solar hydrogen. It should be noted that this innovative technology was implemented for the first time worldwide in Thessaloniki/Greece by the demonstration of the new biodiesel production process and its use on municipal vehicles. The BIOFUELS-2G project promotes the use of 2nd generation biofuels, contributing to the reduction of carbon dioxide (CO2) emissions from transport and the exploitation of waste cooking oil in the city of Thessaloniki.

In order for this demonstration project to be completed several actions had to take place as schematically depicted in Figure 2. All main demonstration activities were performed in the following four phases:

a. Development of a network for waste cooking oil collection by the Municipality of Thessaloniki and the Association of Restaurant Owners of Thessaloniki. Twenty three (23) restaurants located all over Thessaloniki participated in the WCO collection program, in order to collect 3–3.5 tons of WCO. The participating restaurants also acted as collection points for WCO that could be disposed by the public. The WCO collection from the 23 restaurants was performed by a specially converted semi-truck of the Municipality of Thessaloniki.

b. Production of 2nd generation biodiesel from WCO using solar hydrogen by the Centre for Research and Technology Hellas (CERTH). The conversion of the WCO collected to 2nd generation biodiesel was performed in the large hyroprocessing pilot plant of CERTH, leading to the production of 2 tons of the new fuel. The sustainability of the overall production scheme was enhanced by utilizing solar hydrogen which was produced from a special unit which included photovoltaic panels and a custom-made electrolyzer.

c. Testing of the 2nd generation biodiesel in engines by the Aristotle University of Thessaloniki (AUTH). The new biodiesel was tested in engines and vehicles in order to evaluate the associated emissions, fuel consumption and engine effects. The results were compared with those of conventional/market diesel fuels and showed that they were more favorable for some emissions

while they had no effect in the engine performance.

d. Demo utilization of the new biodiesel in a designated garbage truck of the Municipality of Thessaloniki, while recording results and measurements. The demonstration of the new fuel was initiated on 10th of September 2012 [9].

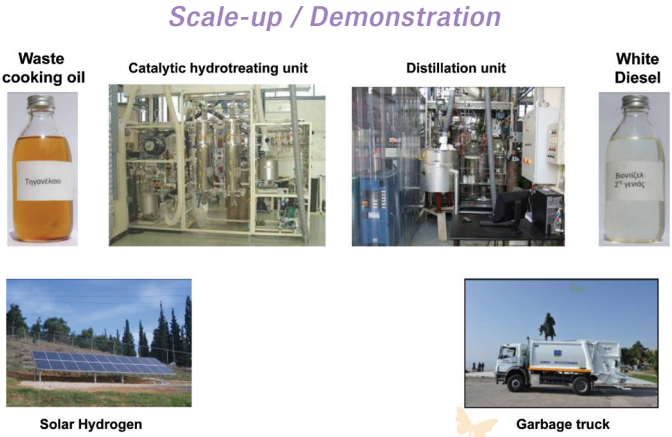

Figure 2. *Demonstration project BIOFUELS-2G [9]*

In all the aforementioned activities it should be noted that women creativity played a leading role as the conception and exploration of the new idea was conceived by the hydroprocessing research group of CERTH led by a female researcher, Dr. Stella Bezergianni. This research group also consists of three research assistants, one female chemical engineer, one female chemist and one male mechanical engineer.

Based on the results of this demonstration project of the new technology, several advantages are expected, including:

- Production of useful products such as environmentally friendly fuels (2nd generation biofuels) from WCO
- Reduction of carbon dioxide (CO_2) emissions during the sustainable production of 2nd generation biofuels, especially when utilizing solar hydrogen
- Reduction of total wastes' volume by the collection of WCOs
- Potential to apply such technology in cities and in particular in dedicated fleets (buses, taxis, garbage trucks etc) reducing the emissions in an urban environment

EXPLOITING THE IDEA

In order to promote this idea, the CERTH hydroprocessing research team entered a national innovation competition "Greece Innovates" [10] and won the 2nd prize. This nomination proved to be a great promotion of this tech-

nology as it was advertised via all national – broadcasting media (TV, radio, newspapers, magazines, e-news etc). The technology was presented in articles in over 16 newspapers, over 130 web-sites, 4 interviews on TV, 15 interviews on radio. Moreover, the technology was also promoted via 15 presentations in national and international conferences, 15 general presentations, and 8 technical publications in renowned scientific journals. The extent of the dissemination of this new technology was effective as it raised the interest of investors inside or outside Greece.

Furthermore, the innovative technology is currently exploited via the collaboration with the Private Sector. In particular CERTH is working with the Greek Oil Company Hellenic Petroleum to explore the feasibility of integrating WCO in an existing refinery. This is project called SustainDiesel is currently partially funded by NSRF 2007-2013 and particularly the research programme SYNERGASIA, for a total duration of 36 months and is expected to be completed by March 2014.

Figure 3. *Technology dissemination and promotion activities*

A new innovative technology was developed for producing alternative diesel from waste cooking oil. This innovative idea emerged via the hydroprocessing research group of the Center for Research and Technology Hellas (CERTH) in Thessaloniki, Greece. The idea was further explored in order to test its technical and practical feasibility and ability to be scaled-up in industrial scale. The exploration was performed by research programs funded by EU. The technology was later exploited via participation in innovation competition, promotion in national and international conferences and also collaboration with the private sector.

The contribution of female creativity on this technological achievement is significant as the hydroprocessing research group is led by a female engineer, while it also consists of a majority of female research assistants.

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YOUNG WOMEN IN SCIENCE AND TECHNOLOGY
THE IMPORTANCE OF CHOICE

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ABSTRACT

Despite significant improvements in the last couple of years, women are still underrepresented in Science and Technology (SET), both in the academic field as well as the private sector. This is due to a variety of reasons, mostly related to the role allocated to women in modern society as well as pre-existing prejudices that form glass ceilings while encouraging male presence in the workplace. It is also however, a result of information or lack of, which places young women in the difficult position of making a career choice, with little knowledge of the available possibilities. What seems to be missing are good role models that could act as inspiration, source of information and guidance, and offer a glimpse into the reality of being a female employed in the field of science and/or technology. Parents, teachers, career guidance counselors, all have a significant role in assisting or hindering the way young women chose their career paths and that choice begins early on from school, all the way through to Higher Education. Choice, essentially, and the factors that determine it as well— as ways of encouraging female participation in Science and Technology— are the focus of the present article, which is based on the results from the European Project IFAC- Information for a choice: Empowering Young Women through Learning for Scientific and Technological Career Paths, realized under the 6th Framework program. The project aimed at documenting the current participation of young women in Science and Technology, primarily focusing on the reasons why there is a significant differentiation between female and male participation. With 9 participants across four member-states, it drew comparisons between countries of the North and South, brought best practices to the foreground, transferability options and above all examined the decision making process made by young women about entering SET. As the article will show, the promotion through the usage of new technologies, of role models, is crucial in breaking the existing stereotype of women in SET. We will show that often Science is rejected as a career choice due to limited information available and positive role models to encourage young girls in participating. Young women seek role models that lead a balanced personal and professional life, and that can act as proof that it can be difficult but not impossible to break through the glass ceiling. Career orientation offered at school through the usage of new technologies is an important step in that direction; however, particularly in countries where the family unit

is especially influential in career decisions, parents must be brought in and educated on the possibilities available. The mass media also play an important role in introducing and sustaining stereotypical images of women in particular professional roles, thus any outreach solutions need to include them.

Keywords: *SET, Role models, stereotypes, transferability*

INTRODUCTION

The 2011 Global Gender Gap Report in its opening paragraph stated that "Given the complexity of the world today [...] we must commit to a new mindset, one that discards old prejudices and inertia and instead commits to new ideas and new solutions. Empowering and educating girls and women and leveraging their talent and leadership fully in the global economy, politics and society are fundamental elements of the new models required to succeed in today's challenging landscape". This is clearly a theme embraced by the European Union, which is already facing a significant gender gap especially in Science and Technology (SET). According to the European Commission women constitute 40% of University graduates in science, mathematics and computing and 32% of all career researchers. The gap widens if one moves beyond the education and factors in future employment and wage earnings.

Despite the significant efforts in closing the gender gap, Europe will still need approximately one million researchers in the coming decade[1]. With this in mind an initiative began, spearheaded by the "Science: it's a Girl Thing" campaign[2]. The video resulted in an outcry from feminists and prominent researchers, who argued that it simply reinforced stereotypes of women doing 'girly' things, in high heel shoes and painted toe nails. The Commission's message was clear. Science can be a feminine endeavor. Despite failing significantly short of what it hoped to achieve, the campaign brought once again to the foreground a fundamental question; why don't girls participate in science and technology more? This was the core question raised by the IFAC project (Information for a choice: Empowering Young Women through Learning for Scientific and Technological Career Paths)

THE PROJECT

The IFAC project (Information for a choice: Empowering Young Women through Learning for Scientific and Technological Career Paths)[3] aimed at documenting the current participation of young women in Science and Technology, primarily focusing on the reasons why there is a significant differentiation between female and male participation. The project

1. http://www.washingtonpost.com/blogs/blogpost/post/eus-science-for-girls-campaigns-spark-a-backlash/2012/06/22/gJQAOi1HvV_blog.html
2. The video has since been removed from the internet.
3. The project was funded by the 6th Framework program, with the participation of ten partners from five European Union countries: Greece, the Netherlands, Austria, Germany and Sweden. The project run from 2006 to 2008 and amongst its key deliverables it produced a policy reflections and recommendations paper and a cross-national analysis of past research projects across the participating countries (www.ifac-project.eu). The analysis and results presented in this paper draw from the IFAC project, its deliverables and its thematic workshops.

targeted young women in high school; ages between 16 and 18, at a time when they are asked to choose their education and future career paths, influenced by their societal and school environment. The project aimed in reaching a balance between informing and inspiring young girls towards science and technology. In order to unveil the obstacles young women face when designing their educational and career path, workshops and information events (seminars) took place, which engaged the participation of experts, intensified the collaboration between the partners and enabled the promotion of the main results of the project and its aims to a wider audience, including uuniversities and schools.

Efforts were made to broaden the target audience, to include research institutes and centers specialized in equality & gender issues, equal opportunities in employment and sensitization of women towards SET, but also guarding and parental groups, career centers & counselors and policy makers in the field of employment. In the past many researches have stressed the fact that for young people it is becoming increasingly harder to find the appropriate career path (see St John-Brooks, 1996). In the era of Life Long Learning it becomes more and more essential for them to receive accurate information and good career guidance in order to understand the world of work, choose an occupation and have a smooth transition from school to employment. Therefore it is important not only to improve the 'fit" between the skills and the ambitions of young persons, but to give them the opportunity to navigate their way in resources that will lead them to satisfying and productive career options without exclusions, which women are experiencing.

The project IFAC supported the idea that if young women have access to accurate information regarding their options in Technological Professions and Science Careers, obstacles faced and successes achieved, they could be better prepared to decide and thus participate. The key is information and positive role models. With 10 participants across five member-states, and using quantitative and qualitative data, it drew comparisons between countries of the Northern, Central and Southern Europe, brought best practices to the foreground, transferability options and above all examined the decision making process made by young women about entering SET.

Why, however, is the inclusion of young women in SET important? As it has been noted during the 1st IFAC thematic workshop[4], their inclusion, or exclusion, has in fact practical as well as moral applications.

- In economic terms the involvement of women in SET is a necessity. They are regarded as an important factor of growth and development both in the case of developed and developing countries. Especially in the latter case, women's underutilization in S&T is equated with a loss in H&R. This can act as a major impediment to economic growth since a critical mass of scientists and engineers

4. IFAC, 1st Thematic workshop minutes, Athens, 30/11 – 1/12/2006 (unpublished).

could help to ensure sustainability.

- In practical terms the involvement of women in SET is essential. A recent report notes that 'A more diverse workforce, which reflects a wider variety of experiences and views, can greatly benefit the S&T enterprise as well as society as a whole'. They bring different strengths (and limitations) to science than men.
- In moral terms the involvement of women in SET is a requirement. A declaration following the Fourth World Conference on Women stated that gender equality is 'an inalienable, integral, and indivisible part of all human rights and fundamental freedoms'. Lack of access to S&T for women creates cultural barriers for their children, especially their daughters.

The project sought not only to identify the main reasons behind low female participation in SET, but also encourage the involvement of young women in SET through the promotion of initiatives and role models. The core finding of the project was that women do not chose 'hard' sciences, because they don't have access to all the information of what that choice would entail and when they do it tends to be negative and biased. Young girls lack access to positive information and particularly role models-women who succeeded before them in overcoming stereotypes and breaking through the glass ceiling.

FEMALE PARTICIPATION IN SET?

Based on available resources (statistics, surveys and analysis), which show that women are underrepresented in Science and Technology, the project focused on the two most significant causes for female exclusion in the field of SET: the pre-existing stereotypes that reinforce male dominance in the workplace and the lack or limited information about career paths.

Educational choices are increasingly determined by future 'employability'. Rapid technological changes and globalization have affected the organisation and the content of work, and both boys and girls opt for scientific and technological subjects in order to secure their "employability". However, although girls are considered to perform better during and after the end of their high school education, more boys than girls will follow higher education studies in sciences and technology and even fewer will follow a career in SET. This phenomenon appears to be common in many educational systems and a series of surveys prove that schools have a responsibility for the discrepancy between boys and girls.

Worldwide surveys (e.g. OECD November 2006, May 2011, Eurydice's Report 2011) show that, while women are not formally excluded from any level of education, nevertheless social stereotypes and traditional concepts for women's role create a status of informal exclusion of girls, thus guiding them to making different educational and professional choices than those of boys. Additionally despite the increasing demand for qualified personnel in research and technology and despite the high rate of women graduates from higher education, women are still under-represented in Science and Technology. On the other hand they retain high employment numbers in sectors such as domestic work, education (teachers,

trainers) and medicine. Surveys note that the highest concentration of women in the field of research and industry is found in biology, health services, pharmaceutical companies whereas there is very low representation in sciences like physics, ICT and engineering. The reasons for that are numerous and studied extensively in the literature (Hayes &Flannery, 2000; Henwood, 1998).

Young persons while trying to choose their future studies and career are under the influence of various factors. We know that young women have deep-rooted educational prejudices that science and technology favour male applicants (Zhu, 2006), that they lack self-esteem in the high technology fields despite their often much higher grades and performance than their male counterparts (Zhu, 2006), that they struggle to balance family and working life often feeling that the former has to take precedence over the latter. The IFAC project however attempted to condense the extensive research available on low female participation in SET and focus on three broader categories that directly or indirectly affect the career choice of young women; the family unit and particularly the background, education and experiences of the parental figure most influential in the family, the school and particularly the science teachers and finally the gender stereotypes sustained and propagated through the media (internet, films, TV, magazines).

THE FAMILY UNIT

The process of choosing a career is "largely based on estimating one's ability and values, skills and abilities required for success in a given occupation, and estimating the work values that will be satisfied by the various occupational alternatives available" (Brown 2002 cited in Beauregard 2007 pp 112). Family influences the decision making process and inevitably the career choice.

A mother's field of work relates to her daughter's choice of occupation (Corcoran and Courant 1987) especially if the mother is employed in 'traditional' female jobs, like education, administration or domestic work. Work-bound youth's parents frequently teach skills that provide her with a broader understanding of her own aptitudes contributing to career choice (Ferry 2006). The process often takes place unconsciously, since "individuals tends to choose an occupation that enables them to satisfy needs that were unfulfilled in their childhood and actualize dreams passed on to them by their family" (Pines & Yanai 2001 cited in Beauregard 2007, pp.114).

The parental influence is strong on gender roles and stereotyping (see Booklet for Career Counsellors, IFAC project) in relation to the cultural milieu and the socialization perspectives that conspire to turn girls away from science- related- careers towards careers that are considered more 'convenient' for family, less demanding and which require fewer educational pre requisites. As it has been emphasised during the 1st Thematic Workshop of the IFAC project (see John & Artzmann 2008) parents and especially mothers influence their girls to their educational choices, because studies in their perception are not necessarily associated with the employment, with the exception of certain fields such as medicine. Furthermore, when they encourage the girls

to study mathematics and physical sciences, they perpetuate negative information-problems of reconciling family and working life, glass-ceiling, male-dominated industry etc. in effect discouraging girls from further pursuing relevant career choices or higher positions.

However one should factor in the educational level of the family, especially the mother, the social status, personality and belief system, as well as the impact exercised by collective experiences. Within a culture of close-knighted families where the opinion of the elders is respected and taken into significant consideration, it is more likely to see a direct impact on career choices than on families that encourage individuality and independent decision-making. It is also important to factor in the economic status of the family. Work-bound youth has very different educational and occupational goals from college-bound youth as stressed by Ferry (2006). When the youth knows that she will need to work and earn an income early on, she tends to choose educational pathways that will enable her to find a job sooner rather than later. This often means that education is used to access the job market and ensure workplace readiness. This again means that in the long-run certain career paths open but future opportunities also remain closed (idem).

In the IFAC project, this was seen across the board, in all the participating countries. It was also evident in the role model interviews, that when the family unit was willing to support financially, emotionally and socially the woman, the career choice made was much more based on her skills, interests and abilities and much less on workplace readiness. In short, the women who choose to navigate the 'complex' pathway of SET have significant support from the family unit or at least, no obvious opposition.

CLASSROOM EXPERIENCE

In the IFAC project the classroom experience (Karpodini-Dimitriadi (adaptation) 2008, limited circulation) was stressed, sometimes more so, than the family unit. It is a systemic factor of huge significance since indirectly through the classroom stereotypes, barriers and identity are constructed and deconstructed. Education is the cornerstone of choice, since it enables-or at least should enable- the youth in making an informed choice based on knowledge, information, interests and understanding of one's skills. According to Zhu, as a special social discourse, education itself is 'constructed by historical and other social discourses. It simultaneously constructs men and women's mentality of gender differences regarding their roles in family and society, which in turn affects their career choices (2006, pp 5). Essentially, school should promote gender equality, by giving equal support, access and encouragement to both girls and boys in mathematics and sciences. Does this really happen?

The educational system of the 5 participating member states was of significance, since the project wanted to see the extent to which they were similar in their approach to reaching out to young girls in maths and science.

The project found that the educational systems of South, Central and North Europe have interesting similarities in regard to gender equity. In

theory they all share a commitment to equally encouraging and assisting girls and boys. In reality, however, most countries require changes in their educational system in order not only to assist girls in non-stereotypical roles, but also to promote among boys the different concepts and thinking processes in gender equality. As it has been stressed during the 1st IFAC thematic workshop in many parts of the world female enrolment is substantially lower, especially at the secondary level; during schooling years girls are not enough inspired by their teachers to become involved in science and mathematics; girls carry a lack of confidence in their mathematics and science abilities; although girls science achievement levels are frequently equal to or even exceed those of boys in early primary school, they usually drop in secondary school. Additional factors are classroom interactions between girls and boys, the often hostile and unaccommodating climate shown by teachers within classrooms for girls interested in science and technology.

Classroom experiences is also a factor[6], which differentiates learning approach and achievement expectations, while girls very often are not given adequate information about career possibilities requiring competency in advance mathematics and/ or sciences, neither they are introduced to women role models with successful math and/or science careers, although in general role models can be an important factor in elevating a young person's aspirations. As a result many pupils held gender stereotypes attitudes towards a range of occupations, associating certain characteristics with a particular gender (for example, women are more caring, better at talking to people etc.; Men are stronger, fitter, more technical and practical). The psychological differential transforms itself into a social dynamic- science and technology is intrinsically linked with masculine characteristic that in turn relate to degrees of status and power. In the end, from the classroom to the everyday life, girls tend to be 'guided' (often unconsciously) towards a 'feminine' and thus lesser social status and power instead of being informed of the variety of options available to them and a broader vision of career choices. School curricula, the teaching practices and the language teachers usually use, reproduce the stereotypes of roles starting from grammar and leading up to the semantics level, while the system of vocational training also leads to restriction of girls professional horizons.

In the end one could argue that at the core of the discussion is the issue of gender stereotyping and its conscious or unconscious promulgation.

GENDER STEREOTYPES

In January 2005, the then president of Harvard University, Lawrence Summers, suggested that the underrepresentation of women in science and engineering might be due, at least in part, to inherent sex differences in cognitive abilities central to math and science. His comments were seen by the majority of his peers

6. ibid

and wider audience to reflect a widely-held yet no-longer-publicly pronounced stereotype of the difference in the natural abilities between men and women. However the problem is not so much that the stereotype exists but that it has seeped in the consciousness of both men and women around the world, acting as a natural barrier to young girl's career development in fields where they otherwise might have excelled. The gender stereotypes range from the different natural abilities (see above), to the caring and nursing nature of women versus the more independent, strong and protective nature of men. Young girls select sectors relating to health and welfare, care, applied arts, such as clothing, graphic design etc. to social sciences, fine arts and humanities. Medicine is probably the only field from the core of the 'hard sciences' that female participation is steady. In contrast boys select sectors that are related to mechanical engineering, electrical engineering, computers, finance and enterprising fields. The socio-cultural stereotypes that relate to gender (e.g. men are better leaders vs women are better with children) impact and construct occupational stereotypes (Hughes 1945) since occupations at all levels have sex-linked images, people think of men as labourers, women as secretaries, men as executives, women as nurses etc (see Dr. Dimitriadi 2007).

Marks and Houston (2002) in their research on girls between 15 to 17 years with high academic credentials found that their career plans were heavily influenced by what they perceived as their 'expected duty' to care for the children they would have in the future. Girls believed that at some point in their life they would have children, and tended to gravitate towards career paths that they believed would offer them the option of life-work balance, or would be easier to quit in order to raise the family. What is interesting is the fact that the issue of family was not questioned, it was assumed as a natural process that would inevitably take place at some point in their lives. Like school, there is a clear lack of a broader vision of life choices, one that incorporates a balanced private and work life. Gender stereotypes, seep in the spectrum of social life, affect schooling and counselling, family and friends, and inevitably create a chicken and egg relationship with lack of information that perpetuates. We now know that "The tendency towards gender-stereotypical preferences becomes even stronger after University, when some women's aspirations to establish a family encourage a shirt toward more traditional feminine occupational fields" (Gadassi & Gati 2009:904)

Gender stereotypes and the lack of information are of course interrelated since "gender stereotypes are often caused by a lack of information; and a lack of information often is a lack of accurate information caused by the persistent circulation of stereotypes concerning SET as well as gender stereotypes" (Karpodini-Dimitriadi (adaptation) 2008, limited circulation). Despite the efforts of the last years to eliminate gender inequalities in the teaching curricula and teaching material gender differentiations and stereotypes are still reproduced. It has been also noted that media and youth magazines promote values and stereotypes of various social groups thus exercising pressure on "girls to comply with female stereotypes and rewards them with social acceptance from their parents, schoolmates, and teachers"(John & Artzmann 2008).

The effects however do not stop at University level. Gender stereotyping will affect not only the career choice of girls but also their professional development where more barriers will be encountered. According to the European Foundation for the Improvement of Living and Working Conditions "most men and a large proportion of women support the traditional division of labour, find differences in salaries justifiable and regard family and childcare as being mainly the responsibility of women" (Dr. Dimitriadi 2007). Gender stereotyping is recycled by both men and women, and shapes future career and life paths.

THE SIGNIFICANCE OF ROLE MODELS

One of the key themes of the IFAC project was lack of information, perpetuated by gender stereotyping but also on its own as a factor of stereotypical career choices by girls. What we mean is that girls make specific choices on the one hand because they are encouraged down certain paths and on the other because they are unaware or have little knowledge of alternative options.

The spotlight then has to turn to the significance of Role models. Young girls usually lack knowledge of the specific characteristics of occupations, what the requirements are to study them, what are the available career paths, time-frame and career advancement options. Supplying information should be the essence of career counselling however it should be taken into consideration that this is not always available or accessible to young girls. For example in Greece, public schools do not offer access to career counsellors-an option instead available in private schools. Thus the socio-economic position of the family inadvertently affects the access to information of the youth. Researches have elaborated the significance of role models in the career decision-making process (Gibson, 2004; Quimby &DeSantis, 2004; Quimby & DeSantis, 2006; Nauta & Kokaly, 2001).

Role models are defined as people whose lives and activities influence another person in some way (Basoc &Howe, 1979 cited in Quimby & DeSantis, 2006). As Quimby and DeSantis stress "role models may be especially important to women because a lack of female role models in non-traditional careers (e.g. engineering) has been identified as a barrier for women who choose to enter these professions" (2006:297). As it became evident from the early stages of the project, the role models exist but are not promoted-largely a result of gender stereotyping. The stories of success are left untold, creating a vacuum where role models are needed. The IFAC project sought to 'test' the role model impact utilizing modern technology. An online database was set up, designed to attract young girls. The design, layout and context was tested on young girls ages 16 to 18 in Germany and the Netherlands, whose input was utilized for the construction of the database. Bearing in mind the breadth and depth of the field, the various participating countries and cultural factors involved, the idea emerged of creating a short database which identified successful cases of women who entered SET, actively worked in the field, and in many cases developed also a successful family life with an appeal and a personal story applicable to a broader European content. The

purpose of the database was not to present the ideal woman. The interviews themselves were extensive, offering the reader a rare insight into the process these women underwent in choosing, pursuing and finally succeeding in their career.

Because of the nature of the interviews (many private questions were asked) we left it up to the women to choose how much they would elaborate on their answers, or how little they would reveal. In the end we provided them with the opportunity to tell their story whichever way they felt comfortable.

Women came from different backgrounds and had different family status as well as age. Although a small sample in total (21 interviews), the professions and careers portrayed were more than inspirational-from biotechnology and Molecular Biology and Genetics to Information Technology and Physics amongst the few. The majority of the participants came from Engineering (8 in total), secondly from Information Technology (5), thirdly from physics and chemistry (4), and finally from biotechnology or biochemistry (4). 14 of them are married and have on average 1-2 children, with the rest either cohabiting or single. In all cases their marital status was a conscious decision, showing that although not easy, there can be a balance between private and work life. The selection was broad enough to appeal to everyone's taste and needs. Young girls visiting the data base might find a "role model' that would inspire their future science and career choices.

Simultaneously educational software for career choices-JOBLAB (JOBLAB - The secret multimedia laboratory for vocational orientation and academic careers) was utilized specifically for the purposes of the project. It is an innovative, ICT-based electronic career guidance tool that was originally developed in Germany to encourage teenage girls to consider a broader range of career options. The software can be used by career counsellors but also the target group itself, for self-exploration. The software was piloted in schools in Sweden and the Netherlands as well as Greece. Career options, pathways, detailed analysis of science jobs, requirements and options, time-frame of studies were fed into the system, as well as interviews (in depth) with Role Models, at least one per profession along with contact details of those who had agreed to act as mentors. Girls were able to access the software, search or randomly scroll through the environment, answer questionnaires drafted by career counsellors, have a profile made up of likes and dislikes, course preference and abilities and find career options in science and technology complemented with life stories of women.
The presentation of successful cases had a two-fold role: they acted in an informative way (what studies did the person conduct, which university, work experience etc) but also as mentors (by providing information regarding obstacles faced and how to overcome them). The project focused primarily on the informative role of the models; however the resources available offered the option of 'tele-mentoring' to selected cases in order to facilitate the dissemination of information towards high school students, career counselors, Higher institutions and Governmental bodies and take one step further the efforts of integrating women in engineering, technology and 'hard' scienc-

es. It is a unique effort in the Greek context and a significant step in the European level. The realization of the project had a direct effect not only on young women in high schools, who could access the information through the IT Information System, but also to career counselors and experts, and educators.

It also highlighted two issues that require further investigation. The first was the issue of information itself. Girls do not just lack information. Worst, at times they have a much distorted picture of certain professions and career paths, e.g. engineering professions, which they associated with masculinity (and thus loss of femininity). Beauregard points out to research conducted on the perceived attractiveness of individual as dating or marriage partners based on their professional choice by Seymour & Hewitt (1997), whereby undergraduate male students claimed that women studying male-dominated disciplines like engineering or physics were inherently unattractive. Women who pursue nontraditional gender jobs are rated by men as less attractive potential life partners. Essentially stepping out the box in the professional sphere is associated with punishment in the private sphere (see Beauregard, 2007; Badgett &Folbre, 2003).
The second issue that arose was that girls tended to wonder at the level of 'hardship' associated with certain profiles especially in relation to their private lives. It was important to them how many of the role models had children, how they balanced their careers and personal lives, if they didn't have families why etc. There was an underlying issue of unwillingness to 'sacrifice' in the short-term for potential career long-term gains if that means an imbalance in favor of work over private life. Again, returning to Marks and Houston (2002) research that focused on a similar age group as the IFAC project, found that the career plans of young girls are influenced by family responsibilities, which they don't yet have but are raised to expect to develop.

Role Models do not necessarily assist directly in career choices. Seeing or meeting a successful bioengineer for example does not mean that the girl will also choose to pursue a bioengineering degree. She might however realize that she can pursue a career path in another SET oriented profession of her preference, inspired by the story and success of the role model presented to her. Increasing exposure to role models in a variety of professions can assist female students in making career choices (Quimby &DeSantis, 2006:304).

RECOMMENDATIONS & CONCLUSIONS

With the above in mind, the IFAC project produced a series of policy recommendations (Hake 2008) aimed not specifically at the participating countries to the project but to the wider audience.

- It can be said that the main objective of attracting women in SET can be accomplished by substituting a very hegemonic and therefore highly selective professional culture by a more diversified culture (Hanappi-Egger 2008). The topic of women in SET is a complex issue ranging from informational to organisational issues.
- Awareness and sensitivity, training for teachers and kindergartens, schools and colleges and adult educators is seen as an important

first step in the right direction along with Curricula reform as part of institutional change.

- Great influence is also exercised by guidance and career counselors, when they advise girls on their educational and career choices. Often counselors and advisors, even if they do it unconsciously, shape their advices on what fits a girl based on societal images of the role of a woman. It is therefore imperative not only to establish a gender sensitive career counseling (Karpodini-Dimitriadi 2008) that will provide accurate information for careers in higher scientific education and the employment opportunities SET offer in high-profile jobs. In order to assist girls to make educational and career choices that will affect their lives they must present and promote successful female role models, who could act as mentors for young women.
- Mentoring and Role Model visibility is an additional step targeting girls towards SET. The down side of it so far seems to be that the focus more often than not on the work-life balance which appears as a woman's issue, and the presentation of Role Models resembling the superwoman, an unrealistic portrayal which can restrict the Role models potential to act in an influential manner. The role model issue is directly linked to the issue of public image of science and scientists.
- Change can be accomplished however by changing the operating systems of our institutions. A gender inclusive approach is needed, to include men as well as women in the discussion and curricula reforms have to be taken seriously. Additional funding is needed and established quotas in institutions to monitor gender equality and create a culture of success for women in SET (Wachter 2008).

After all "It's not the women that need fixing, it's the institutions!" (ibid). For this however to be achieved, transferability of best practices, new ideas and policies is essential. Why is transferability of initiatives important? Transferability provides resources, knowledge and experience to meet the needs of young girls concerning their future educational and career choices. It can be a powerful tool in assisting all stakeholders in pursuing their own strategies for raising student awareness towards gender issues, educational and career options. It facilitates the development and implementation of integrated approaches for addressing more effectively gender issues, educational needs and priorities. Teachers, career counsellors, researches, can compile good practices, experiences, implemented ideas, projects and initiatives and use them as an on-going process to Lifelong Learning and Continuing Professional Development.

As the majority of the European countries face similar problem, the transferability suggestions are valuable to most (see Transferability Report 2008). However, transferability is not an easy issue. It entails different factors and components and it is largely determined by quality. High valued practices and actions are usually linked with high transferability. However transferability does not alone determine an initiative's or a project's worth. There are many issues that must be considered. Generally transferability presupposes similar environments (educational or geographical) in order to avoid misperceptions. The ability for the transfer of an initiative is highly depending on the working methods and it is linked with the issues of applicability (how relevant it is),

adaptability (to the local circumstances) and complementarity (to existing policies and strategies). Adjustments to local conditions must be done. The presentations give information about what can be done based on the experiences of the participating countries. They also show that initiatives must be well prepared before they are delivered. A poor performance will convince young girls that a career in SET is not suitable for a young woman. The selected cases also showed that an initiative could be used to give good PR for a school or company instead of making young women interested in a career in SET. One mission must not exclude the other and a combination of the two aims is advised. When it comes to initiatives directly addressed to young girls, attention should be paid to those who want to complement ordinary education with an initiative.

In order to respond to the problem of underrepresentation and reverse this phenomenon, it is important to have a holistic policy and actual involvement of all interested bodies, both on national and European level, aiming at guaranteeing female scientist employment, strike a balance of both genders participation in scientific jobs and finance communication networks among women. The choice of career is a lifelong process, that demands an accurate and in depth perception of ability, potential and achievement, while it is one of the major areas of concern for young people nearing the end of their schooling. Interventions should be expanded also to the primary education, because results there are much more conspicuous and the interventions can be more substantial at the younger age's pupils.

The under presentation of women in workforce related to SET careers –academia included- is a common issue in all countries regardless geographical areas, as the findings show. The problem still remains even in countries, where initiatives or projects have been implemented like Sweden with moderate results (e.g. summer science camps for girls). This brings us to the important role of education and its type; it came out that we do need not only an education of high standard but we also need the mechanisms that will support it. The guidance system is among the most important aspects, a system that will involve all actors and stakeholders (school teachers and professors, school associations, parents, the business world) so young children, especially girls receive all the required information in order to make proper choices that will allow them to pursue successful careers and help them be happy in their lives.

In most European countries there is a trend to undertake innovative actions in order to motivate young schoolgirls towards Science and Technological careers. The most successful ones are those that combine information with hands on experience. The initiatives (such as summer days, summer camps, etc) can have a positive influence in increasing the number of female students at the science and technological faculties. However, the sustainability of the different actions proves to be crucial. In order to be achieved, the funding should be ensured that is coming from a broad range of sources both state and private. The role of universities and technical colleges is very important. They can offer their labs for practical experience, motivate their students to serve as role models

and contribute to the empowerment of young female teenagers to study in domain that traditionally are classified as male.

Summarizing the project achieved its aims via the presentation of women from SET professions as Role Models, through the supply of best practices encouraging young women to choose academic and career choices in SET. The exchange of best practices extracted valuable information for alternative forms related to enticing young women in choosing a technological profession or applying best practices to maintain women in technological and scientific careers.

Stimulating young women towards science and engineering is crucial to close the gender gap and an important step in achieving parity in the long-term. In order for this to happen, it is imperative to reach a wide audience. The workshops and seminars organized during the development of the project played a crucial role on that creating the opportunities for the selection and exchange of identified best practices in attracting, recruiting and retaining women in scientific and technological careers in both public and private sector. They also provided a fertile ground for discussion by presenting ideas, successful and unsuccessful initiatives, programs and mechanisms and stipulate policy suggestions in order to encourage young women to select studies and careers in SET.

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WOMEN ENGINEERS LACK OF PRECEDENCE
THE "VIRGIN TERRITORY" OF ROBOTICS

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ABSTRACT

During recent history, ICTs have been radically advanced and largely infiltrated daily routine. Additionally, modern educational methods encourage the use of the ICTs in the learning processes. Especially in the education of hard sciences like Physics, the use of ICTs is favored because the students can more easily understand the natural laws and observe in real time the results of the experimental process. Women engineers approach this kind of educational process better as they combine a variety of traits due to their feminine nature that gives them precedence. It is widely accepted that females outperform males in verbal ability, are raised to be more sensitive, have maternal instincts and can be extremely supportive not only to same sex peers but to both genders. These inherent genetic traits result in women's ability to be naturally tuned into the world around them. In a man's world – more importantly when ICTs are concerned- women are often discouraged and need to work a lot harder than men to achieve a favorable situation. This pressure makes women more active and persistent. According to the Foundation for Economic and Industrial Research report for 2010-2011, only the 3,7% of the entrepreneurs between 18 and 64 are women. In the last two decades, the field of robotics has been advancing more radically than ever. Many distinctive robotic mechanisms have been implemented due to the innovative ideas and the outburst of technology. Adam, the Robot Scientist, which was created at Aberystwyth University, is able to perform independent experiments and interpret the results without human guidance. My contribution in the wide field of robotics is my participation in the "Smart and Adaptable Information System for supporting Physics Experiments in a Robotic Laboratory" project (SAIS-PEaRL project), in which we focus on integrating many different standard or brand-new state-of-the-art technologies, in order to provide ICT based functionalities for supporting experiment execution in a robotic Physics laboratory. During my thorough research in the web for my PhD I noticed that few women participate actively in the state-of-the-art educational methods including the ICTs. More distinctively, women that have been involved in robotics seem to have been excluded from the productive or research process. The absence of contributions by women engineers in robotics and in the assistive educational tools it provides has led to

a more masculine approach in the field. That may result in more stiff, plain design or even less imaginative functionalities. Generally, the stereotypes and the biases that exist, with regard to gender have hatched and produced the behaviour of women and the way they are encountered and treated by the society.

Keywords: *Women engineers, gender biases, gender gap, state-of-the-art methods, robotics*

ICTs IN EVERYDAY LIFE

The excessive use of the Information and Communications Technologies has led to an increased demand of scientists, researchers and engineers in the sector. Modern technology influenced every company, public sector and daily routine. New trends in production lines, new methods in management, and even new approaches to educational processes were established and improved living standards. Interactive whiteboards, video conferences, remote controlled laboratories, and simulation of experiments have managed to be the best educational approach to knowledge.

Many individuals turned towards informatics, hard sciences, computer engineering and communications. And this proved to be right because such sectors kept rising and rising during the last two decades. At first only males were interested in these fields but soon after females followed. As far as the robotic sector is concerned, it is unfortunately still underrepresented by women.

WOMEN ENGINEERS IN A MAN'S WORLD

Males have been dominating the engineering industry since its beginning, and women - if any – have been excluded one way or another. In an attempt to achieve a higher level of advancement, women have been working remarkably harder and under more pressure than men. As mentioned above, in this male-dominated sector women feel less valued and less worthy. In some cases, this feeling of exclusion made women more active, persistent and willing to sacrifice their social life entirely in order to prove that they are making valuable contribution to their sector. On the other hand, many women started to feel like second-class employees and never asked for recognition. The truth is that it is not just that feeling of exclusion that they have. Women are evaluated based on their performance while men are evaluated according to their potential skills.

During the last decade, there are few examples of successful women in the engineering field, so few, that ambitious young women did not have role models. The opportunities for career advancement were significantly fewer than men, and this led many women to quit and focus on other fields.

The most important obstacle that needed to be overleapt was the bias about the work-life balance. In many companies, the balance between work and personal life was a drawback only for women. It was largely assumed that women could not work long hours, could not travel for work purposes and when someone got married or gave birth, her family was the first - if not the only - priority.

Under these circumstances, the gender biases were established and the gap between male and female employees in engineering was raised.

WOMEN AND ORGANIZATIONAL CULTURE: THE DELOITTE & TOUCHE CASE

Two of the most remarkable case studies which acknowledge that change in the organizational culture is difficult but yet possible are the Deloitte & Touch case studies by Harvard Business School[7]. During the last two decades, the 50% of the recruitments of Deloitte & Touche were women, but 90% of them never stayed enough so as to be nominated for partnership. Mike Cook, the CEO, wanted to take action in order to stop losing talented women and make sure that there was no "glass ceiling" for women at Deloitte. [Exhibit 1, Number of Women Admitted to Partnership, 1993-2003, Percentage of Women Who are Partners, 1993-2003, Turnover by Gender, 1993-2003]

In order to explain why women left the company at a faster rate than men and develop recommendations to reverse that trend, Cook established the "Task Force on the Retention and Advancement of Women". Next, the Task Force hired a consulting company and after many interviews and extensive analysis the conclusion was just this: Deloitte was a lousy place for a woman to work. Most women explained that they didn't feel valued, that the minute they start a family they are written off, that nobody was willing to invest in them, that they didn't have mentors, that they don't see women in leadership positions and that the don't see role models. On the other hand, the male interviewees explained that it would be awkward to mentor and instruct women due to their sensitive character and also that they could not trust them with important assignments assuming they would break down. Most of them assumed that women wouldn't want to travel or stay late at the office due to their commitments to their families.

These biases and assumptions had been nourished for years until it began to constitute the organizational culture of Deloitte. It became a highly male-dominated environment where all the best projects were assigned to males, the opportunities for career advancement of women were faint and the role models of successful women could be counted with the fingers of one's hand.

Unfortunately, phenomena like these have been observed in many cases, mainly in sectors related to hard sciences, finance, engineering and informatics. Many companies have been warding off women due to the organizational culture and the biases that grow since the first years that women employment was constituted.

Today Deloitte is recognized as a leader in advancing women thanks to the Initiative for the Retention and Advancement of Women that is still in operation.

WOMEN STUDYING ENGINEERING ARE A MINORITY

There are few women engineers employed in large companies. This happens not only due to the organizational culture obstacles or the social biases that have been described above.

7. All the statistics that are studied and presented in this paper have been published in the official website of the "Task Force on the Retention and Advancement of Women". Further information and case study analysis are available by Harvard Business School, in "Deloitte & Touche (A): A Hole in the Pipeline", and "Deloitte & Touche (B): Changing the Workplace".

Reports worldwide show that few women want to study engineering, and far less want a career in the engineering field. According to the CSULB's College of Engineering, women represent less than 15% of CSULB's engineering population[8]. [Exhibit 2, B.S. College of Engineering Graduates by Gender for Academic Years 2006/2007 to 2010/2011] The American Association of Engineering Societies (AAES, 2004) reported that only about 10% of the nation's professional engineers and 20% of undergraduate engineering students are women. This fact is an omen of the potential isolation that women students might experience in a male-dominated field.

Today CSULB's College of Engineering is currently developing more aggressive strategies for increasing the participation of women students in its programs.

These percentages are encountered around the world. From personal experience, during my studies in computer engineering at University of Thessaly, only the 20% of the students that graduated each year were women. Thus, this indicates the importance of embedding gender into business school curriculum worldwide.

EQUALITY STANDS FOR SUCCESS

The characteristics of the feminine nature need to be highlighted in order to indicate the importance of their participation in the engineering sector. The differentiation is crucial in order to provide separate points of view. Reports demonstrate that the feminine nature combines traits that outperform men. Their verbal ability is more developed and they are keen on listening carefully. By nature women are less aggressive and more patient than men. This is very important in today's business hostile environment. Additionally, they are comfortable with multitasking and they don't crash when their schedule is full. The maternal instincts are considered a plus, along with intuition and sensitivity. These characteristics make women approach assignments in an entirely different way than men. As a result, gender diversity helps business provide better results.

However, the engineering sector has been underrepresented by women for years. Additionally, pay gaps between genders were a brutal reality. [Exhibit 3, Percent of Women and Men Employed in Select High Tech Occupations, 2012, Gender Pay Gap in Engineering, 2009]

This sector not only is difficult for women to enter into, but also is almost impossible to advance their career. Empowering women to participate fully can lead in advance of productivity and effectiveness, qualitative change in the organizational culture and generally, improvement in the quality of life of the community.

At present, the goal that needs to be achieved is to support companies in reviewing their organizational culture and establishing new polices to realize women's empowerment. Globalization could be a challenge: companies can be committed to undertake this initiative and empower the role of women, but also they must respect the cultural morals that may apply in local businesses.

8. The statistics that are presented in this paper are retrieved from the B.S. College of Engineering Graduates reports.

ROBOTICS: MALE-DOMINATED GROUNDS

The sector of robotics did not grow substantially until the second half of the 20th century. These autonomous mechanisms have been manufactured in order to perform assignments more accurately, affordably and reliably than humans. Their use applies in a wide variety of fields, such as military, pharmaceutical, hard sciences, industry, etc. The last decades a lot remarkable robotic mechanisms have been designed and implemented, and some of these are considered as massive technological breakthroughs. Robotic laboratories that focus on biological experiments, robotics arms designed for individuals with kinetic disabilities, robotic mechanisms that substitute human labor are few examples of the innovative advances.

Due to my participation in the "Smart and Adaptable Information System for supporting Physics Experiments in a Robotic Laboratory" project (SAIS-PEaRL project), I had to engage myself in the field of robotics. During my tree-year of research for my PhD, I noticed that it was a highly male-dominated sector. The vast majority of the female scientists was in the educational fields, informatics or physical sciences and had an advisory role in the robotic implementations, and women represented just the 10% of the community of robotics. Personally, I followed the field of robotics because it fascinated me, and I would like to encourage more women pursuing a career in the field.

The reasons why women are excluded from the robotic sector might be many and controversial. Robotics combine informatics, engineering, computing, artificial intelligence, hardware and software technologies. These are considered more masculine fields and women are not very interested in them. Furthermore, the stereotypes that are established regarding robotics have discouraged women from pursuing a career in the field. Additionally, there are few female role models in the field. In my opinion, this absence of feminine contribution resulted in more stiff and plain design that lacks of female approach. Additionally, one of the reasons why women are not very familiarized with high-tech products is actually their conscious absence of the design and implementation of software and hardware solutions. Women are more sensitive in engaging themselves in issues that provide practical benefits to society.

It seems a challenge to shorten this gender gap, but it crucial that it is actually shortened. More women must be recruited and retained in the field of robotics. At first, it is crucial to change the perception that robotic mechanisms are cold metallic objects. Robotic mechanisms can provide functionalities that improve quality of life. Women must be inspired by the benefits of robotics. They could be assessed with issues that concern social sensitiveness, such as the improvement of lives of elderly or handicapped individuals. If women engineers are encouraged by their academic communities, they will be more interested and will offer new ideas, talents and skills to the field of robotics. By bringing their talents to the male-dominated engineering field, women can create sparking innovation.

WOMEN'S INITIATIVES

In an attempt to approach more women engineers, and to exchange information about engineering developments and challenges

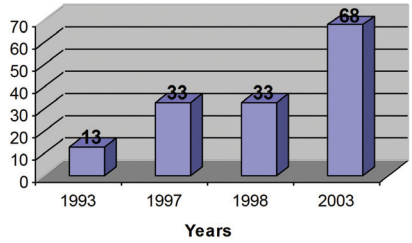
across disciplines and countries, many international groups and events have been organized worldwide.

The Society of Women Engineers (SWE), in conjunction with the India Institute of Technology, Bombay and Indo-US Science and Technology Forum, has launched the Symposium "Women Engineers Leading Global Innovation" in India last August. In addition, the PRME Working Group on Gender Equality has been focusing on promoting gender equality in the workplace, marketplace and community and UN Women have launched the Women's Empowerment Principles (WEPs), which offer practical guidance to business and the private sector on how to empower women.

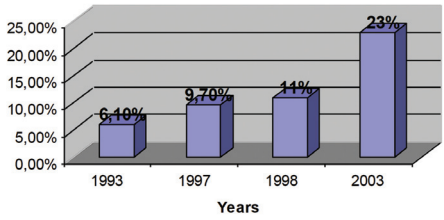
Another community that aims in highlighting the contributions of women in robotics is the "Women in Robotics and Automation towards Human Science, Technology and Society". It targets students, engineers and researchers in robotics, automation, human sciences and technology and everyone that is interested in research and development activities conducted by women.

Exhibit 1

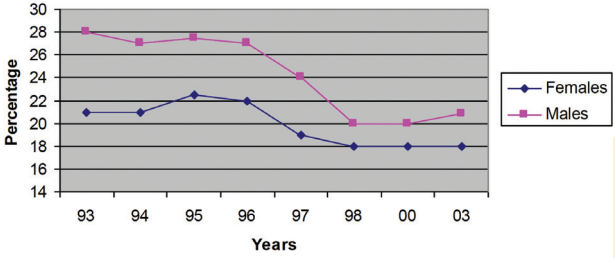
Number of Women Admitted to Partnership, 1993-2003



Percentage of All Partners who are Women, 1993-2003

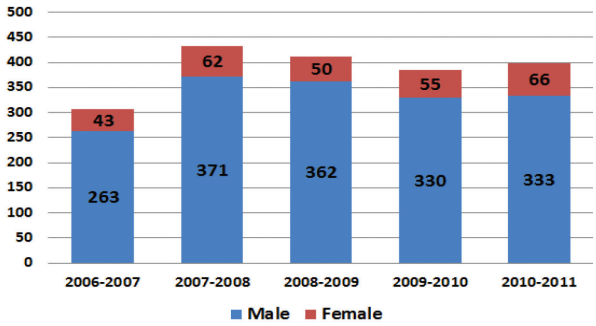


Turnover by Gender, 1993-2003



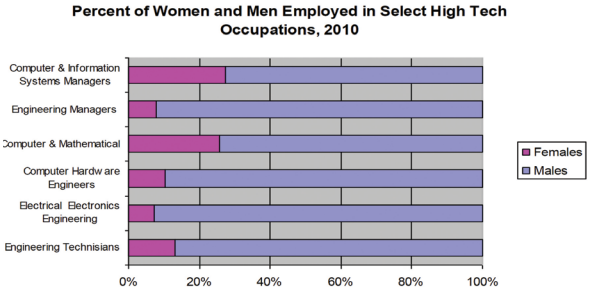
**Source: Women's Initiative Annual Report 2003, Deloitte, 2003 Benchmarks*

Exhibit 2

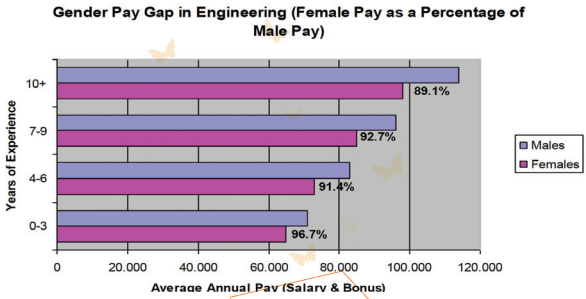


**Source: B.S. College of Engineering Graduates by Gender for Academic Years 2006/2007 to 2010/2011*

Exhibit3



**Source: "Women in High Tech Globally", Catalyst, 2012*



**Source: Based on 4700 engineering bonus reports collected through 2/18/2009*

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women@business
fostering women entrepreneurship through learning, doing and reflecting
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e-commerce
for traditional products - women 50+
www.e50plus.eu
SHE in Europe
combating and balancing out economic disadvantages for women in the EU due to lack of training tools for business and entrepreneurship
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