ZARZĄDZANIE PUBLICZNE 2(38) 2017, s. 163–176
doi:10.4467/20843968ZP.16.014.7229
www.ejournals.eu/Zarzadzanie-Publiczne

Justyna Wojniak
Pedagogical University of Cracow
e-mail: justynawojniak@gmail.com

RESPONSIBLE RESEARCH AND INNOVATION. HOW TO PUT GENDER EQUALITY INTO PRACTICE?

Abstract

This paper discusses a project devoted to the concept of responsibility in the field of research and innovation, which has been initiated by the European Commission in recent years. The key element of this project is performing science with society and for society, which includes wide cooperation with different societal actors, representing researchers, business, civil society and policy makers. An important part of this concept is diversity and gender equality in the research and innovation sector. These issues are also perceived as instruments of shaping correct relationship between science and society. The paper presents the main initiatives under the Responsible Research and Innovation project and selected good practices introduced by research institutions aimed at overcoming gender imbalance in the scientific profession within the European Union.

Keywords: research, innovation, Responsible Research and Innovation Tools, gender equality, European Commission

Streszczenie

Odpowiedzialne badania i innowacje. Jak urzeczywistniać ideę równości płci?

Przedmiotem rozważań w ramach niniejszego artykułu jest koncepcja odpowiedzialnych badań naukowych i innowacji. Projekt poświęcony temu zagadnieniu zainicjowany został w ostatnich latach przez Komisję Europejską. Jego kluczowy element stanowi realizowanie działalności badawczej i innowacyjnej ze społeczeństwem i dla społeczeństwa. Oznacza to szeroko pojętą współpracę z różnymi kategoriami aktorów społecznych, reprezentującymi zarówno samych badaczy, jak i przedstawicieli świata biznesu, społeczeństwo obywatelskie oraz politycznych decydentów. Istotne miejsce w tym projekcie zajmuje kwestia różnorodności oraz równowagi płci w sektorze badań i innowacji, jako jeden z czynników w kształtowaniu relacji między światem nauki a społeczeństwem. Artykuł prezentuje najważniejsze z punktu widzenia projektu inicjatywy oraz przykłady dobrych praktyk wprowadzanych przez instytucje badawcze w celu przezwyciężenia nierówności płci w sektorze naukowo-badawczym w Unii Europejskiej.

Słowa kluczowe: badania naukowe, innowacje, Odpowiedzialne Badania i Innowacje, równość płci, Komisja Europejska

Introduction

As it is well known, science and technology give us the tools both to understand and to control the social and natural phenomena and processes occurring in the modern world [Weber, 1919, pp. 151–152]. However, due to its characteristics, resulting from the applied research rules and procedures, scientific activity in the common view is regarded as quite hermetic and hardly accessible to the average audience.

Scientific activity is followed by a relatively small interest of the general public in the latest developments in science or technology. In many cases public opinion is also convicted of their limited impact on the daily life of the average individual. Another point of view, in turn, is focused on the risks and dangers associated with the implementation of the results of scientific activity or ethical dilemmas that arise on this ground.

This is however a stereotypical and simplistic point of view. However, due to the dynamic development of research activities and the continuous implementation of innovative solutions in different areas, it is important to raise public awareness of the role of scientific and technological innovation, as well as to stimulate an interest in the processes of their creation and their consequences, including their individual dimension. On the other hand, the challenge is to attempt to gain public involvement in the processes related to research and innovation.

Therefore, it is important to draw the public's attention to both existing and emerging inventions or innovations. Equally important is public participation in the debate on the directions of the development of science and its impact on shaping the modern world and society, as well as the already mentioned consequences of these processes, whose beneficiaries or victims will be the next generations.

Hence, this remarkable idea becomes a European Commission's initiative called Responsible Research and Innovation. In a nutshell, its purpose can be described as performing science with society and for society [European Commission, 2014a]. The concept however is not new, as the Age of Enlightenment with its scientific discoveries, increasing industrialization and agricultural improvement particularly emphasized access to scientific and technical knowledge. An essential aim of scientific institutions of the time was to disseminate scientific achievement to audience, aiming at applying knowledge for practical purposes of life [James, 2000, pp. 2–3].

In more recent years, discussions of science and social responsibility have been included to general debates about governance. Some researchers stress the shortcomings of responsibility in science are caused by market driven neoliberal values [Hellström, 2003, p. 370]. The discussions of how science relates to broader societal developments has become a prominent part of the agenda as a governance-problem [Glerup, Horst, 2014, p. 33]. This attitude has led to an initiative of developing science and technology in a more socially responsive way, in a close cooperation with institutions and policies. It includes involvement of various stakeholders, in order to enhance inclusiveness, transparency, and deliberation,

and that promise greater benefits to society than economic growth and technological advance [van Oudheusden, 2014, p. 68].

European Commission's has undertaken this concept and its idea of involving society in science and innovation seems to be particularly remarkable due to international range of action connecting different aspects of the relationship between research and innovation and society. It is also a cross-cutting issue in Horizon 2020, the EU Programme for Research and Innovation 2014–2020 which is being implemented in each of Member States.

As part of the European Commission's concept several areas have been extracted in which responsibility in research and innovation is of particular importance. These include, among others, the issue of gender equality.

The purpose of this article is to present the concept of Responsible Research and Innovation in the most comprehensive way. For this purpose the main objectives of the project, formulated by the European Commission will be discussed, as well as the progress of work on the creation of the so-called RRI Toolkit, which, thanks to its practical dimension has been designed to provide a platform enacting the initiatives taken at the institutional level. Responsibility in the field of research and innovation will be presented with particular emphasis on issues of gender equality.

This analysis of that issue has been conducted from the perspective of the Foundation "Women Scienctists – Polish Women Scientists Network" (the author is a member of the board of the Foundation), which as an actor representing civil society participates in the process of creation of the RRI Toolkit in the area of gender equality. On the one hand, this gives the Foundation an opportunity to observe the directions of development of the concept initiated by the European Commission, and on the other, by participating in one of the nineteen so-called national RRI Hubs, it is a chance to participate in shaping this practical tool. The Foundation is also involved in the testing and dissemination of the project's outcomes at regional and local level. Hence, the presentation of the concept from the perspective of its participants can be an interesting complement to the analysis of source documents of the European Commission concerning the project, and descriptions of good practices carried out during its implementation.

Responsible research and innovation — a response to contemporary societal challenges?

As it was already stated, the European Commission is of the opinion that the development of scientific activity should go hand in hand with the social responsibility of researchers, as well as the consciousness of society. Achieving this state of art will not be possible without the active cooperation between science and society, without dialogue, in which the representatives of both of these spheres would be involved. Maintaining a high level of scientific research and technological innovation requires continuous acquisition of talented researchers and inspiration,

which are provided by society and its needs. The public can not, however, be treated in a paternalistic way, as a passive recipient of research activity outcomes. It is therefore necessary that this activity be subjected to a kind of social control, taking into account the ethical and legal context of ongoing research, as well as the needs, expectations and values essential for society as a whole. This introduces to the development of science and technology an element of democracy, but it also has its practical justification. It results from the fact that the financing of science to a large extent comes from public funds.

Such assumptions became the foundation for the programme *Science with and for Society*, where we can read:

> *Science with and for Society* will be instrumental in addressing the European societal challenges tackled by Horizon 2020, building capacities and developing innovative ways of connecting science to society. It will make science more attractive (notably to young people), raise the appetite of society for innovation, and open up further research and innovation activities. It allows all societal actors (researchers, citizens, policy makers, business, third sector organizations etc.) to work together during the whole research and innovation process in order to better align both the process and its outcomes with the values, needs and expectations of European society. This approach to research and innovation is termed Responsible Research and Innovation [European Commission, 2015a, p. 4].

As the goal the Commission indicates smart, sustainable, and inclusive growth of European societies which is the core of the RRI initiative as a cross-cutting issue in Horizon 2020, the current Framework Programme for Research and Innovation. A set of tools necessary to achieve that objective which was mentioned in the introduction, namely the RRI Toolkit has been created with a view to enable societal actors to bring their contribution in the form of ideas, concepts and proposals for solutions that will strengthen responsibility in the area of research and innovation. The practical aspect of project RRI, which is the development of RRI Tools is funded under the Framework Programme FP7 (2007–2013) and its effect is intended as a set of digital resources to advocate, train, disseminate and implement RRI under Horizon 2020.

It is worth mentioning that for the creation and development of the responsible RRI Tools is a multidisciplinary consortium which consists of 26 institutions representing 30 countries, and its leader is the "la Caixa" Foundation (Spain). The consortium members share their knowledge and experience in the key areas of Responsible Research and Innovation. Moreover, the project aims to be collaborative and inclusive in itself in order to increase creativity and shared ownership of the process. The anticipated result is to design a better relationship between research and innovation on the one hand and society on the other.

Nineteen RRI Hubs have been created across Europe. These hubs are responsible for training in the use of these tools, advocating policy makers at national and regional level, and spreading the concept of RRI: "The ultimate goal is bring into being a European community of practice that draws together all

people and organizations that are active in this new vision of scientific and social development" [European Commission, 2014b].

As was already remarked, gender equality is only one of several issues included in the area of RRI, for which implementation also practical tools are developed within the RRI Tools project. According the European Commission, "gender equality is the result of the absence of discrimination on the basis of a person's sex in opportunities and the allocation of resources or benefits or in access to services" [European Commission, 2011]. It is noteworthy to mention that the European Commission states that gender identifies the social relations between men and women and it refers to social construction of the relationship between men and women, as well as boys and girls. One should take into account that gender roles are dynamic and change over time, while sex identifies the biological differences between men and women and sex roles are universal [European Commission, 2011].

In addition to gender equality, these issues are as follows: public engagement in research and innovation, enabling easier access to scientific results, ethics in research and innovation content and process, as well as formal and informal science education, including promoting scientific careers among young people.

It should be noted that these areas have not been selected at random. Similarly to the gender issue, their development is a key condition whether science and technology are actually developed according to the needs and expectations of society. For sure, as already indicated, significant doubts expressed towards science and scientists by public opinion are originated from ethical issues. A similar attitude concerns limited access to the results of research, which requires not only access to publications, but also, and perhaps above all, emphasizing the importance of popularizing activities in this field.

It is also worth noting that familiarizing society with science and technology will not be effective without adequate preparation of the potential recipient. In this case education, both formal and informal plays an important role, providing the public with the tools necessary to assimilate certain information in the field of science or technology, but also arousing interest in this sphere. Proper education also enables the development of critical opinion about the directions of research and achievements in this field. It is no less important to familiarize young people with the specifics of the profession or vocation, as some people perceive it, which is the scientific activity. On the one hand, this is conducive to weakening the stereotype of science as a hermetic, accessible only to selected individuals, and on the other – it is a prerequisite for attracting young, talented students who relate their future professional lives to science and technology.

Gender diversity and its impact on research and innovation

Despite changing patterns of economic activity and family life in contemporary societies in recent decades, which give the representatives of both sexes wide possibilities of activity, we still have to deal with the barriers and constraints that

arise from the stereotypical perception of social roles of women and men. The continued mechanisms regarded as invisible barriers still are powerful and have a particularly negative impact on women, who are also active in the field of research and innovation. They are described as: glass ceilings, sticky floors or slippery ladders.

In the field of science particularly an acute phenomenon seems to be a so-called leaky pipeline. This mechanism involves the gradual outflow of women from the world of science, as they climb subsequent career ladder. Therefore, referring to higher education graduates the proportions are aligned in terms of the number of men and women, and in the case of PhD graduates women comprise 47%. However, as shown by data from the European Commission, the increasing number of female graduates is not reflected in the increase in the number of female researchers [European Commission, 2016, p. 62].

The Commission's periodic report, entitled *She figures* clearly shows areas of disparities. In 2011 female researchers in the European Union accounted for only 33%, the same percentage as there were in 2009. Only in the case of eight of the 28 EU member states, the percentage of female researchers has exceeded 40%. In this group, in addition to Portugal, are mostly countries of Central and Eastern Europe: Bulgaria, Estonia, Hungary, Latvia, Lithuania, Romania and Slovakia. With regard the countries of this part of Europe, including Poland, the tendency to feminize science is specific. It should not be a reason for satisfaction, however, as it is merely a confirmation of underfunding of the scientific sector in these countries. What emerges is thus a pattern: the largest proportion of women can be found in the countries and sectors where spending on research and development are the lowest. Respectively, the smallest percentage of them operate in countries where spending on research and development are the highest. This goes hand in hand with the suggestion that men are leaving these areas because they are not sufficiently financially attractive [European Commission, 2003, p. 82].

Another area of clear gender inequality, are the conditions of employment of women and men in higher education. There is a clear predominance of part-time employed women and/or women who have precarious contractual arrangements. In the EU in 2012, 13,5% of women in research were in part-time employment (versus 8,5% of men) and 10,8% had precarious contracts compared to 7,3% of men [European Commission, 2016, p. 101]. Moreover, in this area of activity the gender pay gap still remains visible: in 2010, women's average gross hourly earnings (EU-28) were 17,9% lower than those of men in scientific research and development [European Commission, 2016, p. 100].

Gender based inequality based on gender can be seen also in relation to the share of women in leadership positions and the decision-making bodies in academic and scientific institutions in EU member states. In 2014 women accounted for 20,1% of the heads of institutions, while in 2010 – 15,5%. Within the EU-28, women head 15% of institutions with the capacity to deliver PhDs, compared to 2010, when this number was at 10% [European Commission, 2016, p. 126].

The level of gender imbalance is closely related to the field of science. Within the EU-28 one can observe the predominance of women in the social sciences

and humanities. Female professors constitute in this case respectively 26% i 23,8%). On the other hand, the most significant imbalance exists in engineering sciences and technology (7,9%), and agricultural sciences (4,6%).

In this context, a question arises, whether we should consider these tendencies as natural and to some extent justified, when they still remain so clear, and statistic data indicate a permanent trend in this area. The answer to this question seems to be, however, quite obvious. First of all, in a democratic society, every citizen has the right to choose his/her education and professional activity. One cannot therefore use the criterion of gender, social or economic status as factors determining choice. An opportunity to enhance one's individual life, both man and woman, is in this case of key importance.

In case of research and innovation activities, and indeed in many other areas of social and working life ensuring diversity of views and approaches is particularly valuable. Its achievement is impossible or significantly more difficult, if a given sector is dominated by representatives of one sex. Diversity also means contributing to the economy by developing new ideas, patents, and technology on the basis of different experiences, needs and points of view represented by women and men. No less important is making research more responsive to social needs which, as already mentioned, may show some differences among women and men [Schiebinger, Klinge, 2013, p. 8]. In addition, it is worth noting that the pursuit of sustainable participation and the impact of both sexes on research activities is a key condition for the development of an innovation process in a more inclusive way without creating barriers or shaping elite groups, which would control these processes, aiming to meet their specific interests or needs.

On the other hand, the gender imbalance in research and development may entail consequences which society and often also those responsible for shaping policy in this area are not always aware of. And so one can recall the danger of reducing research perspective, poor research and missed opportunities in the methodology, content, and impact assessment of research. Another consequence of this type of imbalance can be distortions and omissions, as far as areas of interest. In the case of innovation and technology, the dominance of a male or female point of view can result in reducing the opportunities of implementing the project and can limit its market potential. From this point of view gender biased research is harmful to public policy and industrial development. They also bring significant limitations at the level of creativity, new perspectives, questions, and areas of research.

Gender equality in responsible research and innovation terms

Accordingly, it is necessary to quote the standpoint of the authors of the Responsible Research and Innovation concept, that "To achieve responsible research and innovation, we need all the talent at all levels – from both men and women" [European Commission, 2014c].

The key condition for achieving gender equality in innovation and research is breaking down gender stereotypes. Gender-based horizontal segregation is still a characteristic of the contemporary labour market. A notion of appropriate or 'suitable' occupations for men and women is still deeply rooted in professional and educational activities. Although research on the issue has been mostly focused on women's efforts to break existing gender inequalities and move into male dominated sectors, it should be stressed that men undertake untypical occupational choices as well.

Therefore, taking into consideration that the problem of gender imbalance in research and innovation has its negative consequences not only in this particular field of activity, but it also acts negatively on society as a whole, the fight against this state of affairs has become one of the basic conditions for research and innovation performed in a responsible manner. As part of this concept one can distinguish several elements, which are essential for the achievement of gender balance in research and development. Among them are: promoting gender balance in decision making, ensuring gender balance in research and innovation teams, embedding gender equality in research proposals as well as reflecting on and integrating the gender dimension in the R&I content [European Commission, 2014c].

Imbalance in the indicated areas was emphasized in the already cited *She figures* report. And so, the European Commission draws attention to the fact that in recent years in the 28 EU member states under-representation of women in scientific outputs is clearly visible. It has been more severe in innovation, namely patent applications for inventions, than in research scientific publications: "In the EU-28 31% of publications had a woman corresponding author between 2011 and 2013, whilst a mere 8,9% of patent applications registered a woman inventor between 2010 and 2013" [European Commission, 2016, p. 149]. Moreover, between 2010 and 2013 in EU member states the proportion of scientific publications with a gender dimension ranged from none in agricultural sciences, engineering and technology, and natural sciences to 6,2% in the social sciences. Not less important is raising awareness towards gender-sensitive investment and funding in research and innovation. Male researchers in the EU also tend to have greater success in funding applications in national programmes. In 2013 the success rate for men was 31,8%, while for women – 27,4% [European Commission, 2016, p. 171].

An important part of the action for ensuring gender equality in research performing institutions and universities is creating gender-friendly workplace cultures. It includes a working environment that supports gender equality in terms of advancement, job quality and equal representation in the decisive bodies. The actions that research organizations can take include recruitment and promotion measures, gender balance in recruitment committees, flexible career paths, work–life balance measures, and support for female leadership development. According to The European Research Area Survey of 2014, 64% of research performing organizations indicated that they had introduced gender equality plans [European Commission, 2015b].

In the context of previous deliberation one should refer to specific projects, which aim on the one hand to promote gender equality in terms of Responsible Research and Innovation, and on the other – to provide access to information, materials and examples of good practice. They can serve not only as a source of inspiration, but also a collection of practical tips, what specific steps a particular institution can take to gradually achieve the goal of gender equality.

One example is GenPORT which constitutes an online community of practitioners, representing different organizations as well as individuals active in the field of gender equality and promoting excellence in science, technology or innovation. The GenPORT project works as an internet portal, which covers the natural and social sciences as well as the humanities. It provides access to resources on gender and science issues, organized thematically, linguistically or geographically. One of the recent topics is gender balance in the decision making process and integrating the gender dimension into research content for research funding organisations. The authors raise also an issue of sexual harassment in research and research organisations. GenPORT is perceived as an arena for organisations and individuals to showcase and act as a gateway to research resources, policy information and practical materials [GenPORT Consortium, 2016].

Another example is the STAGES project coordinated by the Department for Equal Opportunities of the Italian Presidency of the Council of Ministers with the participation of research institutes and universities from Denmark, Germany, Italy, the Netherlands and Romania. Their aim is to implement self-tailored action plans including: awareness-raising initiatives in high level institutional bodies, training modules on gender equality for internal decision-makers, mentoring programmes for young women scientists, actions to enhance the visibility of women scientists, updated management and research assessment standards, course content development, leadership development, work-life balance measures, gender quotas on committees, and promotion and retention policies.

An important part of the participants' activities is to produce a deeper understanding of structural changes, monitoring and assessing the processes in each institution, and mutual learning practices among partners. STAGES participants also spread, among the European universities and research institutes successful negotiation strategies concerning gender-equality initiatives [Project STAGES, 2016].

Another initiative which is worth mentioning is genderSTE designed as a network of policy makers and experts involved in promoting a fairer representation of women and better integration of gender analysis in research and innovation. An important part of the project is disseminating know-how on structural change of institutions and on methods for gendered analysis in research. Specific fields of interest are: cities, transport, energy, climate and industrial innovation considered from a gendered point of view. Participants of this initiative represent government bodies, research organizations, universities, non-profit and private companies from 40 countries, not only from Europe, but also from international organizations [genderSTE, 2016].

Good practices of gender sensitive research

According to the definition of the European Institute for Gender Equality, good practice upon evaluation demonstrates success at producing an impact which is reputed as good, and can be replicated [European Institute for Gender Equality, 2013, p. 10]. From a gender sensitive research point of view, good practices should be assumed as any experience or initiative, method or technique that leads towards mainstreaming a gender perspective, women perspective or feminist perspective in research. It also should demonstrate some success and impact that could help other universities or research institutions to create gender sensitive research. What is worth to underline, applying a gender perspective in research and innovation will not lead directly to full gender equality. It will however reveal inequalities in this field, create gender awareness and knowledge necessary to undertake action [Danilda, Granat Thorslund, 2011, p. 17].

As the European Institute of Gender Equality puts it, there are three types of actions that should be included in Gender Sensitive Research: gender perspective in research contents, in training and counselling, as well as in funding, and in scientific transfer or dissemination; gender equality in research teams, including activities to strengthen women's leadership in research projects; and the equal distribution of power positions, as the lack of balance has been pointed out [Effective Gender Equality in Research and the Academia, 2016, p. 3].

An interesting set of guidelines to determine the extent of the inclusion of gender perspective in research or innovation activity has been introduced by Effective Gender Equality in Research and the Academia (EGERA Consortium). These are as follows: gender and equality in terms of describing a project or action (including the project's title, team composition, abstract, and conclusions), classification and awareness-raising of sex/gender issues based on specific terminology, rethink priorities and social interests of the research (who will benefit or be ignored by the research project), rethink concepts and theories, formulation of research questions, sex and gender in the samples, the analysis of the assumptions on gender, the analysis of covariates, participation in research (facilitating the empowerment of men and women and other marginalized groups), rethink standards and reference models, gender-sensitive dissemination – introducing the differences in points of view of women and men, and the results presented with plain, gender-neutral, non-sexist and non-infantilizing language [Effective Gender Equality in Research and the Academia, 2016, pp. 9–13].

Taking into consideration the concepts and practices mentioned above, one can agree that there are gender barriers in research and the academia to overcome. As every institution is different and works in an individual way, interventions may vary and different strategies to overcome barriers to career progression for women and men may be adopted. An individual set of drivers to support reducing gender stereotyping and promoting a gender responsive work environment seem to be the most important part of these activities. However, a set of general recommendations can be identified.

Through the glass ceiling

A very promising example of addressing gender inequality in higher education and research has been developed at University College Cork. The project *Through the Glass Ceiling. Career Progression Programme and Strategy for Female Academics and Researchers* (2010–2012) has been aimed not only at helping empower women academics and researchers in relation to their own careers. Of equal importance has also been addressing organizational structures and developing a Gender Equality Action Plan [University College Cork, 2013, p. 4].

Among the main activities of the project aimed at empowering female academics a mentoring scheme was introduced. A female mentor considered as an objective and critical friend supports and encourages a mentee to reflect on her career and progress in a critical way. The mentor shares her own experience and institutional knowledge with her younger colleague and becomes a senior role model for the young researcher. Another part of the project are career planning workshops. These complex activities include building a detailed career plan, creating a scientific cv and establishing a professional researcher's profile, using social media as well.

On the other hand, a gender sensitive perspective at the institutional level has been met by creating a Gender Equality Action Plan. The commitment to gender equality as a development strategy for the university was one of recommendations, as well as empowerment of the underrepresented sex in the recruitment process and supporting workers with family and caring responsibilities, according to work-life balance measures. One of the goals of the University College Cork addressing the gender issue is awareness raising among the academic community. The ways to reach it are as follows: publishing an interactive equality newsletter for staff and students, appointment of an Equality Officer and support from the human resources staff for individual career development of researchers. An important part of gender perspective mainstreaming in academia is also a strategic collaboration between universities and other relevant stakeholders in the higher education sector, namely creating a sort of network for gender equality, as a platform of exchange experiences, discussing obstacles, searching for solutions to potential problems concerning the gender issue in the academic field.

Creating a gender friendly work environment in research and innovation, as well as promoting equal attitudes towards male and female researchers is one of conditions to overcome the domination of men and lack of women in decisive bodies, committees, boards, recruitment and executive panels. Women still face structural barriers at different stages of their professional path (glass ceiling), they are perceived as lacking in qualities for leadership roles. A common gender biased view and the lack of visible female role models may lead to a loss of skills and expertise within higher education and research [Morley, 2013, p. 7].

From this reason developing programmes to support women's career planning and their professional development is a necessary step in overcoming gender disparities. It is also a condition to assure diversity and plurality of leadership styles

which make the institution more likely to be successful, and is a part of gender justice and a human rights issue, namely the prohibition of gender discrimination.

An interesting and noteworthy solution for increasing women's representation at senior leadership levels are affirmative actions or quotas. Intervention programmes are aimed at increasing the representation of historically excluded groups and they include suitable strategies and practices to reach these goals. On the other hand quotas can be perceived as discriminatory (in this case against men). However, they can be useful and necessary as a compensation in areas where gender segregation is particularly evident [Morley, 2013, pp. 10–13].

Conclusion

The idea of Responsible Research and Innovation raises a number of questions, not only about the practical aspect of this project, but also about the extent to which, if at all, the research process may be the subject of deliberation or arrangements, and how these actions should proceed. In the first place creating science for and with society demands curiosity. Are contemporary societies curious enough to be interested in the basic principles of the physical, biological or social world development? Are they able to follow technological solutions and rapid social changes?

As it was stated, science still is perceived as an area hardly accessible to ordinary people. Understanding science demands the development of specific characteristics, such as creativity and independence in information search. They should be stimulated in the process of education. Therefore, it raises the question of the extent to which modern educational systems, not only in Poland, are ready for this kind of challenge. In education strategies or reform projects these issues are firmly underlined. It remains however doubtful whether these are not just idle declarations devoid of real dimension.

Referring to gender equality policies one can observe a similar attitude. Many countries are concentrated on combating gender-based harassment and violence, or on trying to enhance the representation of women in decision-making bodies. But the main challenge is traditional way of perceiving gender roles and stereotypes. While countries have implemented various general instruments of providing equal opportunities for women and men, more specific strategies are often lacking. One of them is the aim of reaching equality in the field of research and innovation.

As new areas of social relationships emerge, global scale creates new patterns of gender relations. Such entities as international organizations (the European Union), transnational corporations, global mass media and new information and communication technologies create their own gender regimes. As R.W. Connell states: "Masculinities and feminities are socially constructed configurations of gender practice, are also created through a historical process with a global dimension" [Connel, 2005, p. 1805].

This observation should therefore be combined with a certain margin of flexibility in the perception of men and women active in different areas, both in professional and private life. Of course, the previously mentioned stereotypes about the roles of men and women continue to remain powerful, but we can observe a positive change. It is possible thanks to initiatives, including European Union involvement in the area of science and innovation. In this case, however, as in the perception of the role and importance of science in the functioning and development of contemporary societies, the role of education is of key importance. An education process, devoid of stereotypes and with an emphasis on the diversity and equality of all pupils can significantly contribute to creating society free of prejudice and the tendency to discriminate against individuals and groups in any area of social life.

References

Connell R.W. (2005), *Change among the Gatekeepers: Men, Masculinities, and Gender Equality in the Global Arena*, "Signs", Vol. 30, No. 3.

Danilda I., Granat Thorslund J. (eds.) (2011), *Innovation and Gender*, VINNOVA information.

Effective Gender Equality in Research and the Academia (2016), *Good Practices of Gender Sensitive Research. Guidelines and Information Sheet*, Universidad Autònoma de Barcelona, Barcelona.

European Commission (2014c), *Gender equality*, http://www.rri-tools.eu/gender-equality [accessed: 08.07.2016].

European Commission (2015a), *HORIZON 2020, Work Programme 2014–2015, 16. Science with and for Society*, European Commission Decision C (2015) 2453, 17 April 2015.

European Commission (2015b), *European Research Area Facts and Figures 2014*, Directorate-General for Research and Innovation – European Research Area, Brussels.

European Commission (2003), *Marnowanie talentów: sprawa prywatna czy publiczna? Kobiety i nauka w krajach Enwise*, Directorate-General for Research and Innovation, Brussels.

European Commission (2014b), *RRI Tools: Building a Better Relationship between Science and Society*, http://www.rri-tools.eu/project-description [accessed: 09.07.2016].

European Commission (2016), *She Figures 2015*, Directorate-General for Research and Innovation, Brussels.

European Commission (2011), *Strategy for Equality between Women and Men 2010–2015*, http://ec.europa.eu/justice/gender-equality/files/documents/strategy_equality_women_men_en.pdf [accessed: 20.07.2016].

European Commission (2014a), *What is RRI?*, http://www.rri-tools.eu/about-rri.

European Institute for Gender Equality (2013), *Good Practices in Gender Mainstreaming. Mainstreaming Gender into the Policies and the Programmes of the Institutions of European Union and EU Member States*, Luxembourg.

GenderSTE (2016), *Gender in Science, Technology and Environment*, http://www.rri-tools.eu/-/genderste-gender-in-science-technology-and-environment [accessed: 17.07.2016].

GenPORT Consortium (2016), *What is Gender?*, http://www.genderportal.eu/.

Glerup C., Horst M. (2014), *Mapping 'social responsibility' in science*, "Journal of Responsible Innovation", Vol. 1, No. 1.

Hellström T. (2003), *Systemic Innovation and Risk: Technology Assessment and the Challenge of Responsible Innovation*", "Technology in Society", Vol. 25, No. 3.

James F. (2000), *Guides to the Royal Institution of Great Britain: History*, Royal Institution of Great Britain, London.

Morley L. (2013), *Women and Higher Education Leadership: Absences and Aspirations*, Leadership Foundation for Higher Education, London.

Project STAGES, (2016), *Structural Transformation to Achieve Gender Equality in Science*, http://www.rri-tools.eu/-/stages-structural-transformation-to-achieve-gender-equality--in-science [accessed: 22.07.2016].

Schiebinger L., Klinge I. (2013), *Gendered Innovations. How Gender Analysis Contributes to Research*, Directorate General for Research and Innovation, Brussels.

University College Cork (2013), *Through the Glass Ceiling. Career Progression Programme and Strategy for Female Academics and Researchers*, Equality for Women Measure 2010–2013, Cork.

van Oudheusden M. (2014), *Where are the Politics in Responsible Innovation? European Governance, Technology Assessments, and Beyond*, "Journal of Responsible Innovation", Vol. 1, No. 1.

Weber M. (1919), *Science as a Vocation* [in:] H.H. Gerth, C. Wright Mills (1946), *From Max Weber: Essays in Sociology*, Oxford University Press, New York.