

Chapter 13

From Innovation to Innovative Gender

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Abstract

Of interest in this chapter is the search for the wider sourcing of creative ability because traditional methods have failed to solve a variety of problems – social, political, daily life, family, economic, cultural, and religious – which as unconventional and practical applications become innovations. How multidimensional the abilities to tackle them are also depends on the ability to develop innovation. In view of the growing importance of gender studies, the conditions indicated should include another one, namely gender. And the concept of Innovative Gender has been accepted, ascribing to women and men equal measure, opportunities and situations included in the model of the innovation genome. The starting point of the Innovative Gender study is to build four dedicated matrices filled with information (variables) describing a given area including gender, among which the crucial one is cooperation.

Key words: creativity, innovation, innovativeness, innovative gender

Introduction

In spite of the diagnosis that the European Union is burdened with a triple crisis – of substance, trust and power (Kukliński, 2011) – leading to its institutional weakening on the global stage as an innovator, the growing predominance of thinking via procedures, and the expansion of the overwhelming control limiting freedom of choice, more offensives and strategies to intensify the development of research and innovation in all Member States are constantly being created. The failure to achieve the goals of the Lisbon Strategy is explained by a lack of political will and the conviction of heads of state that the objectives were too ambitious and that they lacked a cohesive policy between the whole European Union and the strategies of individual Member States, which is further compounded by the poor state of public finances in many EU countries and the crisis of 2008. A kind of “extension” of the Lisbon strategy is the Europe 2020 Innovation Union, and in particular the use of the procedure to shift the trust and support of innovative activity to the regions. Will yet another programme free EU innovation from its

“straitjacket” (*Green Paper on Innovation*, 1995)? Entrepreneurs argue that EU regulations harm innovation, and universities that the use of EU support, which, it is true, has enabled a leap forward in improving the quality of infrastructure, in the long run will lead to the financial collapse of institutions that dramatically take out loans necessary for their own contribution to projects and maintaining this infrastructure, and they are already no longer sufficient for the research. Of interest in this chapter is the search for the wider sourcing of creative ability, because traditional methods have failed to solve a variety of problems – social, political, daily life, family, economic, cultural, and religious – which as unconventional and practical applications become innovations. How multidimensional the abilities to tackle the mare, both those inherent in people, motivated by the market, organized or elemental, as well as those aided or impeded by state policy in different countries or regions, also depends on the ability to achieve innovation. In view of the growing importance of gender studies, the conditions indicated should include another, namely gender. This article is a contribution to the research project now underway at the Jagiellonian University in Kraków; a presentation of proposals for research areas in which the role of gender in the innovation process can be captured. On this basis, it will be possible to develop research methods which will enable assessment of the strength of this relationship symbolically defined in the InnoGend project.

13.1. Innovation, innovativeness – the driving force for development

Although the literature contains many and increasingly diverse definitions of innovation, just as in the process of innovation the literature contains many proposals for models that were created over the last 30 years of the previous century, there is no way not to refer to these once again; however, the keynote is this time to seek changes in the economy and society, denoting innovation, in which gender may be of particular importance. Driven by the probably Latin origin of the word innovation – *innovare* or “creating something new” – the definitions formulated by many famous scientists emphasize that innovation is “the process of converting existing possibilities into new ideas and putting them into practical use. It is, briefly speaking, the introduction of new products, processes or procedures to broad use” (Allen, 1966, p. 7). In this trend, for example, industrial innovations and specific steps towards their formation could be pointed at (Freeman, 1982), or, specific abilities, skills, competences of entrepreneurs (Drucker, 1985). Companies achieve competitive advantage through innovation if they introduce innovation in a broad sense (Porter, 1990). In the same vein, Fagerberg writes about innovation as “the application of new ideas in practice (2006), and the conversion of ideas

into activities which bring benefits” (Stachell, 1998, pp. 33-34). The importance of the commercialization of ideas and concepts is particularly exposed by the point that “... the commercialization of innovation does not necessarily imply only the highest technological achievements (radical innovation), but also includes the use and practical application of know-how, even on a small scale (incremental improvement, innovation)” (Rothwell and Gardiner, 1985, p. 168) as in practice not all innovation is based on inventions (Jasiński, 1997). For some researcher innovation is about creating value out of ideas, concepts Soete (2006), when the ideas are brought to the market in the form of new products, better designs, better manufacture or distribution and when it all takes place within the institutional environment of the national innovation system. In this context, just as in Freeman (1987), which decided to locate the concept of a “national system of innovation” in economic theory, the scale of elements describing the concept of innovation greatly expands, emphasizing the importance of qualitative changes in the development of innovation, such as changes in the system of education, science, engineering and technology, the intensity of cooperation between the actors involved in the innovation process; there is also a causal investigation of these changes that in different ways activate or destructively influence people’s behaviour. Schumpeter, considered one of the forerunners of innovation theory, emphasized that innovation is virtually in the centre of all phenomena, difficulties and problems of the economic life of the capitalist community. The sense of innovation here is “the formation of a new production function” (Schumpeter, 1939, p. 87). The entrepreneur is characterized by dynamism and innovativeness and thus creates new businesses, new products, introduces a new organization of production and new production technologies. The entrepreneur-innovator therefore decides on the driving force for economic development and the concept of innovation refers to broader creative human activity. Schumpeter’s marking of the special role in the development of the economy through innovation by entrepreneurs has over the years been the basis for many researchers to seek a definitional basis and modelling within this conception. Innovations make a “new combination of factors,” which may be caused by (Schumpeter, 1960, p. 128):

- introducing new or improving existing products,
- using new or improving previous production methods,
- opening a new market (expansion into a new market),
- introducing new ways of buying and selling,
- gaining a new source of raw materials (using new raw materials or semi-finished products),
- introducing a new method of organization (changing the current method of organizing the production process).

This definition is regarded as a classic, and began the discussion on the importance of innovation in economic development, both in a positive sense, providing a jump in the growth of economic efficiency, as well as negative, because it is capable of inducing economic crises. It is true that many flaws are attributed to it (Czerniak, 2013, pp. 14-15) such as its too broad scope, tautology, open nature,

and lack of usefulness in practice, so from the point of view of the considerations here we need to underline its usefulness. Schumpeter's, one might say theory, of innovation, is invariably a reference to establishing the importance of innovation as a driver of economic growth, which in particular is also emphasized in the current policy of the European Union (Europe 2020, 2010). The broad approach to innovation also enables us to capture areas in which the importance of gender would be possible to determine. Particularly important here is the whole sphere of innovative entrepreneurship, in the assessment of which the significance of gender and the resulting specific predispositions already constitute a significant range (mazowia.eu). In addition, this definition implies a clear and strict reference to the commercial dimension of innovation, in which the processes of production and distribution are of decisive importance, hence considerations should apply only to the appropriate competences to these processes. In this view, the technical changes and organizational changes required and only partly social ones underlie innovation and are identified with the new, or with the modified, which has been brought forward to modern, institutional definitions of innovation (Oslo Manual, 2005). Alongside the digressions as to its too broad and general treatment of innovation, there is also the question of the scale of newness as the essence of innovation. Within the broad understanding of innovation, the reference to the new, as the basal characteristic of innovation is sometimes regarded subjectively. For example, Kotler (1978, p. 224) believes that "... the concept of innovation refers to any good, which is seen by some as new," while, within a narrow understanding of innovation, Mansfield, says to the contrary, that "An invention which has been used for the first time is an innovation" (Mansfield, 1968, p. 99, introducing a reservation as to the understanding of new). There is certainly no doubt in this case about Freeman's definition, from which it follows that not every novelty can be considered an innovation, but only that which is "... the first commercial introduction (application) of a new product, process, system or device" (Freeman, 1982, p. 7). In any case, it may not be necessary to discern definitional compliance as to the scale of the key fact that determines innovation, which is "novelty." Does the scale relate to individuals, companies, the economy or the global market, or to producers or consumers. Here radical definitions, declaring innovation to be "novelty" at the scale of the economy (Schmookler, 1966), collide with decidedly weaker definitions in which, to be able to talk about innovation, "novelty" merely refers to a product, process, organization of the company, work, or enterprise-scale marketing (OECD, 2005, pp. 46-47), disregarding the requirement of absolute novelty and originality on the global market (Hall, 1994, p. 17). The practice, however, drastically verifies this approach, in fact, it is the leaders of innovation who count in the world; all the rest are only "followers." Invariably the catalogue of innovation characteristics distinguished, and therefore the processes in which they are born, may include (Okoń-Horodyńska, 1998):

1. Combining the intellectual elements with material. Every innovation must be preceded by mental work containing creative elements, and triggering creativity. This connection implies today, often ineffectively (as in Poland) by regulation, the

institutionalization of mediation at the interface between the industrial sphere and R&D facilities (e.g. higher education, research and development bodies, research institutes), and requirements apply here to professional solving of both theoretical and methodological and practical problems.

2. The increase in the role of the intellectual element, which together with industrial development has become an essential factor in any progress (knowledge-based economy, creative economy). An external expression of increasing the role of the theoretical and methodological preparation for changes in industrial production is the creation of a variety of scientific and research and development institutions (an increase the number of places where knowledge is created and where creativity is taught), specializing in intellectual, pre-production, innovation activity, and expansion of the scale of specific education, as well as technology transfer.

3. The accelerated increase in mixing the complexity of the relationships between intellectual and material elements, as well as the internal complexity of these components, due to the turbulent changes in the technosphere, the increasing complexity of systems, new data, incomplete knowledge, new issues, people, and risks. The practical work is combined with the necessity of a multidisciplinary and interdisciplinary (holistic) approach to solving problems related to the operation of the innovation process. There is also a need to integrate practical activities, and the continuous interpenetration of intellectual and material elements carried by specialized cells in the production process, determined by the social environment.

4. Innovation is characterized by a degree of risk and uncertainty higher than in other ventures (incomplete knowledge) in the process of creating innovation and obtaining the desired scale of innovations as results of innovative activity.

5. The need to ensure the leading participation of the best cells of human potential in a given system, its multidimensional skills and tangible economic research facilities ensuring that innovative changes are carried through. This best potential functions as a paradigm for other entities involved in innovation processes.

6. Innovations force a growing relationship between the degree of maturity of the innovation processes and the dynamics of the development of industry, economy and society, forcing innovation on society, a culture of innovation, the growing involvement of the public in innovative activity takes on a permanent character. Lack of innovation entails the inefficiency of the economy to solve complex problems hitherto unknown, which ultimately results in a waste of manpower and resources and inhibits growth.

7. Although technological innovation, regarded as a determinant of the process of taking a lead in the global economy, is still considered decisive in modern competition, approaches that focus on social innovation are being developed with great intensity. Hence, the European Commission has also strongly verified its approach to innovation by introducing a definition of social innovation understood as: "The development and implementation of new ideas (products, services and models) to meet social needs and the creation of new social relations and cooperation" (European Commission, 2013).

8. Innovation is a business tool, it requires the creation of better jobs, which, according to Schumpeter's approach, means that it provides resources with new opportunities to create wealth.

9. Innovations determine the competitiveness of a company and an economy, which means that they decide on the presence of a company in the market and the position of the economy on the global scale.

10. Innovations have the ability to polarize entities and sectors of the economy, and also countries and regions of the world, in terms of the level of innovation in the economy. Because the innovativeness of an economy entails creativity, creative capabilities, the formation of new social relations and motivation for traders towards innovative activity, comprising a constant search for new results for scientific research, R&D work, new concepts and ideas, to develop and launch the production of new or improved materials, products, equipment, services, processes or methods devoted to the market or to meet the variety of social needs necessary in practice.

Following the aforementioned features the following two constitutive elements of innovation should be distinguished:

- Innovative change – which, in contrast to unintended changes is at least to some extent prepared and developed in an intentional way in the process of innovation.
- Actual innovation – a feature that should characterize the baseline of innovation as an intentional process. The degree of novelty imposes on the innovation development process an additional risk that arises from the possibility of not achieving economic success. Thus the problem of measuring the sources and effects of innovation becomes more justified because not every product, service or process that meets the criteria of innovation brings tangible benefit for the company just because it meets the criteria of innovation.

It seems that one of the more useful sources for Innovative Gender from the point of view of the search for approaches to innovation, is the one that selects the scale of innovation on the basis of the consumer and the manufacturer (Hirsh and Peters, 1978, p. 9). Through innovation the consumer stabilizes or changes the consumption patterns and the following have an impact here (Jasiński, 1997, p. 12):

- Continuous innovation determined, for example, by tastes, a fashion for colours, sizes, shapes, etc.,
- Dynamic continuous innovations triggered by a wave of some technical changes, e.g. the electric toothbrush, knife, comb, massage device, still current today and even solar powered,
- Discontinuous innovation – extremely rare, different from anything known before, and requiring the consumer to learn to use and enjoy.

The manufacturer, on the other hand, assesses the degree of novelty commercially and technologically. So, it is important to improve the product, replace it, make minor physical changes, expand the product lines, and diversify. It is hard not to see that it is the consumer point of view on innovation in the process of creating a model of consumption and even a consumption strategy may be a good field of research for the assessment of the significance of gender in innovation

activity. Even general observation allows us to show that women subordinate decisions about choosing consumption patterns to tastes or fashion, and men technical usability, to a much higher degree.

Since, as demonstrated with a significant sample, innovation is defined in different ways, further agonizing over definitions can be omitted for now, knowing there is a large literature on the subject. Another issue, however, seems to be worth signalling. The increasing complexity of productive life as a fundamental element of the management process creates fewer and fewer opportunities to give birth to an ad hoc innovation as a sudden “miracle” solution. Although, as Drucker states, there is more innovation based on “brilliant ideas” than all the rest put together – about seven out of every ten patents – they are the most risky and least effective source of opportunity to innovate, and are characterized by the greatest “mortality” (Drucker, 1985, pp. 143-145). Therefore, today the essence of innovation should be seen rather in its permanent, systematic and consistent character. This approach has also been adopted, for example, by the European Union, which has been trying for years to implement a European innovation policy (Okoń-Horodyńska, 2013), as schematically shown below. Unfortunately, the institutional environment for expanding innovation policy in the EU through the multiplication of programmes and regulation stifles people’s creativity and strengthens the bureaucracy and waste of public funds. This is one example of how even the best formulated programmes are converted into economic failures due to lack of strategy.

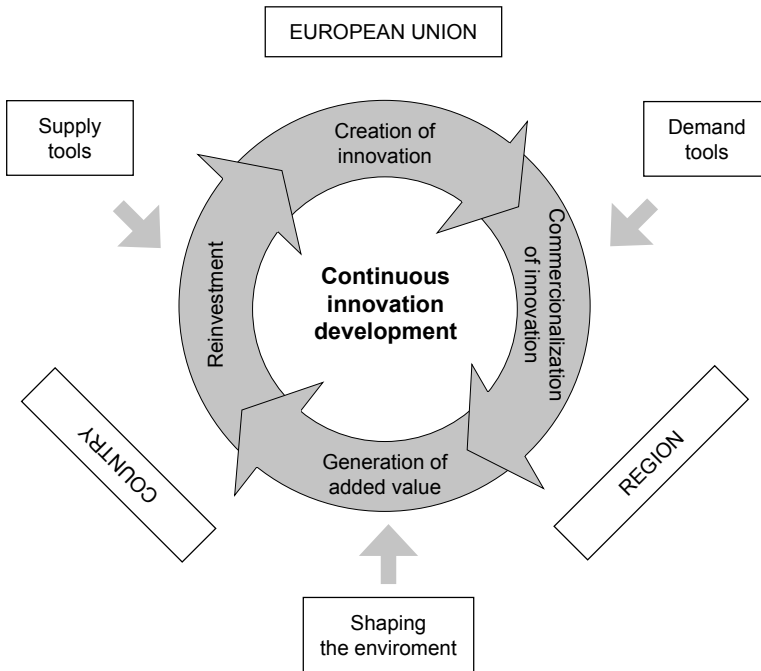


Figure 13.1. EU innovation policy environment
 Source: own elaboration.

The philosophy determining the development of innovation of regularity and continuity of innovative activity is certainly associated with the security companies and economies in the unique resources as a source of not only innovation but also sustainable competitive advantage. This concept, developed in the resource approach to innovation, even assumes that a company is a collection of such rare material resources (production and technology) and intangibles (managerial knowledge, intellectual property rights, organizational culture) so difficult to imitate and replace, that have an impact on the business' results (Mizgajska, 2013). In particular, however, thanks to a specific set of resources, enterprises have a dynamic ability to integrate and reconfigure internal and external competencies in a rapidly changing environment, which allows them to create and innovate. However, this resource approach has also not avoided a kind of criticism, although interesting conclusions from research on the impact of workers' experience, competence, ability to co-operate, and knowledge in R&D as one of the indicators of innovation activity remain valid today. A company's and an economy's innovativeness depends on the state of originality and also availability of resources for innovation, considered to be one of the most progressive factors of socioeconomic development, even at the local level. Innovativeness is the ability and willingness of economic entities/regions to constantly seek and use in business practice different types of resources, such as the results of research and R&D, new concepts, ideas, inventions, improvement and development of technologies for producing material and non-material (services) goods, business models, skills and abilities of people, the introduction of new methods and techniques in organization and management, and the improvement and development of infrastructure and knowledge. Innovation and its sources are subject to a detailed measurement process acting on the place of a given company in the market in global competition or rankings of innovation leaders (IUS, 2013). In this thread we must also see the research field for the assessment of gender roles as the characteristics of one of the resources in achieving dynamic ability to innovative activity in the business, the economy, and society.

13.2. Dualism of innovation: creativity and commercial viability as a source of exploration of the importance of gender

Although the set of ideas presented on innovation and innovativeness does not in any way exhaust the definitional proposals contained in the rich literature on the subject, each in its own way shows that the sense of innovation should be seen in the driving force resulting in change in all its surroundings. And though they may have different natures, extents, and directions, starting from minor adjustments

and ending in “upheavals,” and that they are able to both facilitate and hinder our lives by constantly complicating the environment, they can also affect national security, or seriously affect the system of values, institutions and decision-making processes. So every element of that driving force, including gender, requires careful discernment and proper harvesting. In this sense, the best, definition, closing the discussion, is that innovations are hard, deliberate, focused work that requires knowledge, diligence, creativity, perseverance, and commitment; they require the use of the innovators’ strongest points, and they are the effect induced in the economy and society, as they cause changed behaviour for both businesses and consumers (Drucker, 1985, pp. 152-153). There is no doubt, however, that the concept of “innovation” is used in a double sense:

- 1) on the one hand, it describes a process involving research, design and development, creating new relationships between people and also the organization of manufacture of a new product, process or system, which is often called the “innovation process,” which lies at the basis of human creativity,
- 2) on the other hand, it describes the first use of a new product, process or system, achieved by commercialization.

The dimension of creativity indicates the potential of knowledge and skills at the same time to create something new. Although this is a thought process it leads to new, original ideas, concepts, associations and new ways of solving problems in practice. It is a process that is difficult to define, thus escaping simple schemata. For example, Einstein said that if he had an hour to solve a problem on which his life depended, he would devote 55 minutes to asking the right question and then even less than 5 minutes would be enough to solve the problem itself (<http://www.ideachampions.com/weblogs/>, accessed 15.02.2014). The creation of something new can occur because both as a result of painstaking research and quite by accident, and also as a result of intuitive impulses and imagination, unconventionally, as Einstein emphasized. Intuition and imagination are mostly conducive to knowledge and deep reflection, predispositions to explore the knowledge and the ability to use it. Creativity’s uniqueness lies in the fact that it is actually inexhaustible: “You can’t use up creativity. The more you use, the more you have” (Angelou, 2010). Let the exemplification of this thesis be the interesting set of quotes posted defining creativity on the website functioning under the slogan: *The Head of Innovation* (2010). And so:

- “The things we fear most in organizations – fluctuations, disturbances, imbalances – are the primary sources of creativity.” – *Alfred North Whitehead*
- “The chief enemy of creativity is ‘good sense.’” – *Pablo Picasso*
- “Everyone who’s ever taken a shower has had an idea. It’s the person who gets out of the shower, dries off and does something about it who makes a difference.” – *Nolan Bushnell*
- “As competition intensifies, the need for creative thinking increases. It is no longer enough to do the same thing better ... no longer enough to be efficient and solve problems.” – *Edward de Bono*

- “I make more mistakes than anyone else I know, and sooner or later, I patent most of them.” – *Thomas Edison*
- “Creativity is thinking up new things. Innovation is doing new things.” – *Theodore Levitt*
- “The secret to creativity is knowing how to hide your sources.” – *Albert Einstein*
- “Creativity is allowing yourself to make mistakes. Art is knowing which ones to keep.” – *Scott Adams*
- “Don’t think. Thinking is the enemy of creativity. It’s self-conscious, and anything self-conscious is lousy. You can’t try to do things. You simply must do things.” – *Ray Bradbury*
- “Creativity is the sudden cessation of stupidity.” – *Edwin Land*
- “There’s room for everybody on the planet to be creative and conscious if you are your own person. If you’re trying to be like somebody else, then there isn’t.” – *Tori Amos*
- “The key question isn’t ‘What fosters creativity?’ But it is why in God’s name isn’t everyone creative? Where was the human potential lost? How was it crippled? I think therefore a good question might be not why do people create, but why do people not create.” – *Abraham Maslow*
- “To live a creative life, we must lose our fear of being wrong.” – *Joseph Chilton Pierce*
- “By believing passionately in something that still does not exist, we create it. The non-existent is whatever we have not sufficiently desired.” – *Nikos Kazantzakis*
- “Creativity is discontent translated into arts.” – *Eric Hoffer*
- “A truly creative person rids him or herself of all self-imposed limitations.” – *Gerald Jampolsky*
- “Things are only impossible until they’re not.” – *Jean-Luc Picard*
- “Anxiety is the hand maiden of creativity.” – *T.S. Eliot*
- “Creativity is piercing the mundane to find the marvellous.” – *Bill Moyers*
- “The new meaning of soul is creativity and mysticism. These will become the foundation of the new psychological type and with him or her will come the new civilization.” – *Otto Rank*
- “The more original a discovery, the more obvious it seems afterwards.” – *Arthur Koestler*
- “It’s not what you look at that matters, it’s what you see.” – *Henry David Thoreau*
- “If you have nothing at all to create, then perhaps you create yourself.” – *Carl Jung*
- “I can’t understand why people are frightened of new ideas. I’m frightened of the old ones.” – *John Cage*

Creativity often escapes the canons of rationality which, in the commercial dimension in turn, are critical, and at first glance it apes the absurd, yet it can lead to the invention of something new, thanks to the unconventional imagination.

Defining precisely, but also identifying and measuring creativity as a process of creating something new is very difficult. If only because the “new” is often very variously understood and perceived, and sometimes, too, ignored. Creativity may indeed serve to improve the quality of social and economic life, but manipulated by a few it can reduce this quality. In recent years, the global crisis has exposed this spectacularly, where the substrate is primarily the creation of new financial instruments, including fraudulent pyramid schemes, toxic derivatives and other financial pseudo innovations. Another example is activities, highly detrimental to consumers and the environment (but driving the profits of producers), aimed at producing products on the market whose life span is short, or that forces the need for additional, complementary services and products (an example of this power supplied matching only one type of device, such as a computer, telephone, etc.). No coincidence that more and more researchers point to a new social phenomenon appearing – progress fatigue. This also ties in in practice with the decreasing marginal utility of progress. Difficulties in assessing and measuring creativity are also related to the scarcity of statistics on the subject and its meanders. In addition, a variety of social stereotypes and prejudices are superimposed on it, often erroneous assessment, which is highly correlated with gender stereotypes. Therefore, an important field of research for assessing the role of gender in creative activity would be the sphere of creative thinking and analysis of the defining elements of this skill.

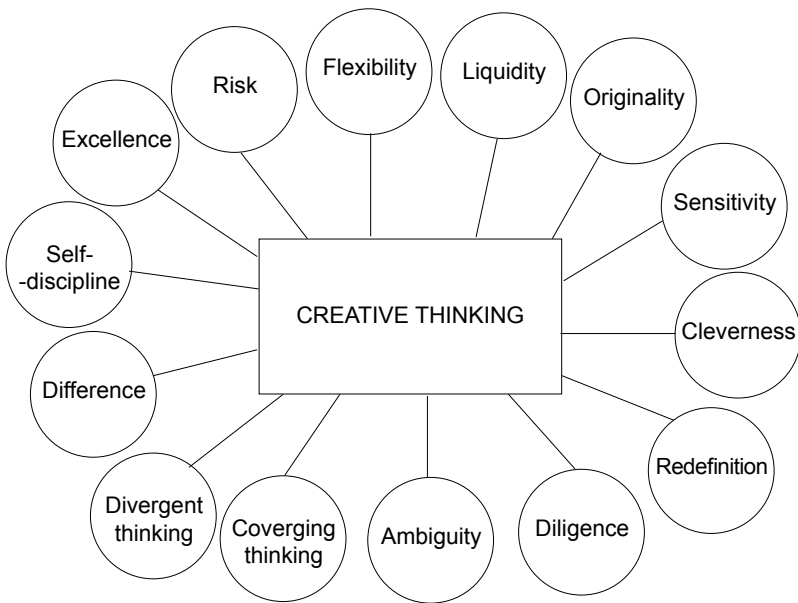


Figure 13.2. Key features of creative thinking
Source: own elaboration.

Bearing in mind that natural creativity reaches its peak in preschool, then definitely decreases – so that we can ensure these declines are not drastic we must constantly use different formulas to support it. Thus, for example, as a result of education, the acquisition and accumulation of knowledge can improve creative efficiency, which, however, left without improving the knowledge and application in education, life and work, techniques creativity have also been declining. Creativity techniques and deliberate raising awareness allows us to expand the scale of the characteristics of creative thinking, for example, excellence, self-discipline, openness to risk, otherness, and so on. Shaping these features is in essence determined by individual psychosocial and cultural predispositions, including gender. And, the scale of the use of these features determines the quality of our thinking (Figure 13.3) and the loss of creativity.

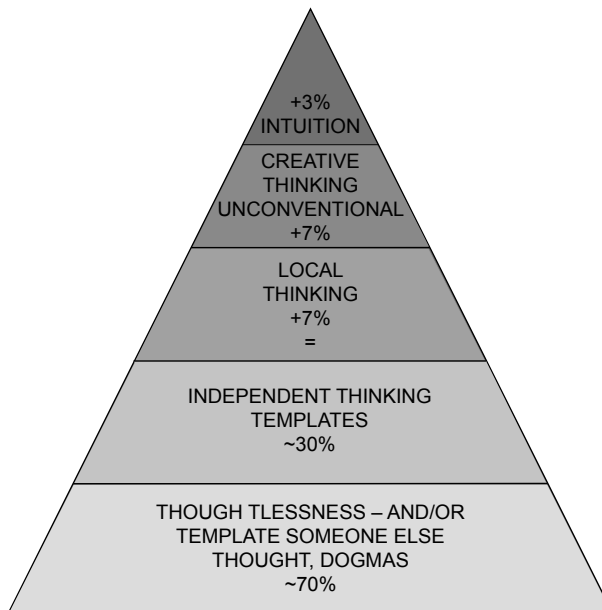


Figure 13.3. Pyramid of the quality of human thinking

Source: J. Chafee (2001), *Potęga twórczego myślenia*, Warszawa: Bertelsmann, p. 487, za: Cempel (2012).

Looking at the figure and taking the approach of Einstein, only 3% of thinking is the source of problem solving in an unconventional breakthrough way. It is thus hardly surprising that creativity, identified with the ability to look more broadly, bravely meeting challenges and with the ability to cope with any situation, is considered to be one of the most desirable features in today's job market. For some, creativity is an innate trait, others argue that the development of creativity can and should be taught (education and creativity techniques) and it is triggered primarily by (Tracy, 2010):

- clearly defined objectives – here first and foremost continuity of planning and focus on the benefits that realization of these objectives will bring us is emphasized. It is believed that achievement of the benefits constitute motivation and mobilization of our mind to look for new solutions and ideas, which can significantly facilitate the achievement of planned objectives,
- urgent problems – here it is important to have a reference to the ability to cross barriers, master obstacles, and transform them into challenges. Growing excitement and commitment to meet the challenges, increases the scale of creativity in action,
- specific questions – as already indicated in the quotation from Einstein, a well-constructed, sometimes uncomfortable, or provocative question can trigger a real volcano of creativity providing a rapid solution to a problem.

In the above context, creativity is also a base for research and development (basic research, applied, and experimental development) involving the pursuit of systematic conduct of creative work, undertaken to increase the stock of knowledge, including knowledge of humanity, culture and society, as well as for finding new uses for this knowledge.

According to official statistics, women are much less represented in the field of creativity, innovation, invention and scientific achievements. This is reflected, *inter alia*, by statistics for the Nobel Prize. Women Nobel Prize winners are less than 5% of the total awarded this prize. Men dominate decisively. There is a slightly more favourable image according to data on the number of double Nobel Prizes. This double prize has been awarded twice to four scientists so far, including one woman – Pole Maria Curie-Skłodowska (Nobel Prize for Physics in 1903 for her discovery of radioactivity, and Nobel Prize for Chemistry in 1911 for obtaining pure radium). However, in assessing the true role of women in the field of creativity we cannot in any event settle only on the figures. This is aptly captured by sentence from Albert Einstein: “Not everything that can be counted counts, and not everything that counts can be counted” (<http://izquotes.com/quote/56404>, accessed 21.02.2014). But attempts to measure creativity are commonly taken (Table 13.1), although gender issues are not included in them.

Although the examples of indicators measuring creativity presented give rise to a certain institutional assessment of the level of creativity in general, the ingenuity and creativity of women in solving many difficult issues of everyday life is not to be underestimated, nor in the major areas of social and economic life, including education, design, fashion, medicine, media, tourism, social communication, and in the sphere of culture (the creative industries). This is extremely important, but very difficult to measure, because it is not as spectacular as the great scientific discoveries, for example. In this sense, women are great but silent inventors. The Polish proverb “where the devil fails, you can send a woman there” exposes the great creative potential of women. Certainly better exploitation of the potential of women’s creativity will be supported by growing segments of the information

Table 13.1. How to measure creativity

Indicator	Range	Source of information
European Creativity Index	Human capital, technology, institutional environment, openness and diversity, social environment	The contribution of culture to creativity, KEA, 2009
Hong Kong Index	A set of interacting variables which make up the creative environment	Home Affairs Bureau of the Hong Kong Special Administrative Region Government, A study on a Hong Kong Creativity Index, 2004
Euro-Creativity Index	Set of characteristics that attract the “creative class” – technology, tolerance, and talent	Europe in the creative age; Florida, 2004
Flemish Index	Technological innovation, entrepreneurship, openness of society. It is used for inter-regional comparisons	A Composite index of the Creative Economy, the Catholic University of Leuven, 2006
UNCTAD Global Data Base on the Creative Economy	International trade in creative-sector goods and services (export/import)	Creative Economy Reports 2008 and 2010, UNDP, UNESCO, UN
Indicators for innovativeness		
EIS, IUS	Technological innovation. It is used for comparisons between countries, the version poorer in variables (ERIS) also for interregional comparisons.	The European Innovation Scoreboard, The Innovation Union Scoreboard, European Commission

Source: own elaboration.

society, in this area there is definitely a growing demand for female staff. Through the use of their potential favourable conditions are created for the implementation of “social futurism,” proposed by Alvin Toffler, primarily through the creation at all possible social and economic levels of centres focused on interdisciplinary “brain activation,” in order to discover the social consultants of the future. Social futurism may be a remedy for the narrow economic technocracy and economic myopia, the more so because the progress and rate of change are rendering the traditional objectives of enterprises obsolete (Toffler, 2000), and foresight studies form the basis for building development strategies at various levels of the economy and society, and other institutions (Okoń-Horodyńska, 2011).

Creativity is a term that has left the field of theoretical discussion (Florida, 2002) and permanently placed itself in the economy, providing the basis for the formation of creative industries, experimentally in the UK (Department of Cul-

ture, Media and Sport, 1997), to awaken the desire for a creative economy in many other countries (Creative Economy 2008). Creative industries can be defined as those that have their origin in individual creativity, skill and talent and which have the potential to create wealth and jobs through the generation and exploitation of intellectual property. Originally, the areas falling within the creative industries were advertising, the antiques trade, architecture, crafts, design, fashion, film, video and computer games (programs for entertainment), music, the performing arts, publishing, software, and TV and radio; but today the scale is gradually broadening (Creative Economy, 2013, p. 22). The transition from intellectual discussion about creativity to its materialization may be the characteristics included in the definition that “Creativity is a holistic process by which ideas are generated, developed and transferred to value.” And in this sense, creativity involves what people usually understand by the concept of innovation and entrepreneurship; it includes both the art of creation (birth) of new ideas and the discipline that gives these ideas shape and development until it is a realised value” (Kao, 1997, p. 17). “In the process of transformation of knowledge into value, the decisive variable is creativity” (Kao, 1997, p. 7). It should probably be added, however, that this is about the transformation of knowledge into an exchange value, and then it is already a transition from making the creative process in the laboratory or workshops, often ending in an invention, which is commercialized via the process of products and services whose place is on the market. In this context, the subject of interest is definitions that clearly define the need to focus on the dimension of commercial innovation. For example:

- “Commercial innovation is the result of the application of ingenuity associated with a business model, technology, or market to create a new product, process or service that will be successfully introduced to the market” (Alic et al., 1992, p. 43),
- “Innovation is the process by which an invention or idea is translated into the economy” (US Department of Commerce in 1967, p. 8),
- “Innovation requires at the same time close coordination of the relevant technical expertise and excellent knowledge and assessment of the market in order to achieve economic, technological, or other success. Only when these factors occur simultaneously can innovation bring economic or technological success” (Kline and Rosenberg, 1986, p. 275),
- “The road of innovation requires a significant commitment from many entrepreneurs in both the private and public sectors” (Van de Ven et al., 1999, p. 149),
- “Innovative change is the creation and marketing of new goods, new technologies and the accompanying restructuring of the organization’s systems” (Janasz, 2004, p. 29).

The combination of creative and commercial approaches to innovation is included in the statement, that “... the invention is the first appearance of an idea ... while innovation is the first attempt of practical application on the market” (Fageberg et al., 2006, p. 4). Both the creative and commercial dimensions of in-

novation require specific skills where gender may be a domain or a barrier. These skills should cover a broad area of activities, such as:

- effective learning and knowledge accumulation,
- converting different (and sometimes absurd) knowledge resources into ideas of a rational nature,
- practical transformation of ideas into new products, services, processes, systems, and social interaction,
- creating new value streams that satisfy the shareholders of the company and ensure sustainable growth,
- creating new jobs,
- offering a new service to customers,
- improving the quality of life and promoting the sustainability of society,
- building alliances, cooperation,
- managing innovation, or managing all activities that contribute to the introduction of innovations on the market (to life) (EFQM, 2005, p. 5).

The development of science and technology, and changes in the ecosphere, mean that the concept of innovation and also the formation of its relationship with creativity change (Table 13.2, Figure 13.4).

Table 13.2. The evolution in the perception of innovation

Past	Present
Developed one-dimensionally.	Developed multi-dimensionally.
A discontinuous process.	A continuous, systematic process.
A means to achieve your own success.	The transition from the perception of innovation as a means to achieve your own success to joint success with a co-operator through the joint development of innovation.
The invention.	Innovation as a process.
A linear model of innovation.	A nonlinear dynamic model of innovation.
Based on the requirements of forecasts.	Is the answer to the sense and expectations – is the solution to a problem. It is the result of anticipating future expectations of the business environment in the broad sense and opportunities for science and technology.
Independent.	Interdependent. Innovations increasingly require the use of knowledge of many fields of science and technology at the same time.
Occurs in individual disciplines of science and technology.	It occurs as a result of cooperation between team understood as global R&D team structures, cooperating continuously (24x7).

Source: own elaboration based on C. Harris (2006), "Applying innovation", *IBM Innovation Week*, Eindhoven, p. 6, http://ec.europa.eu/enterprise/policies/innovation/files/ius-2013_en.pdf [accessed January 2014].

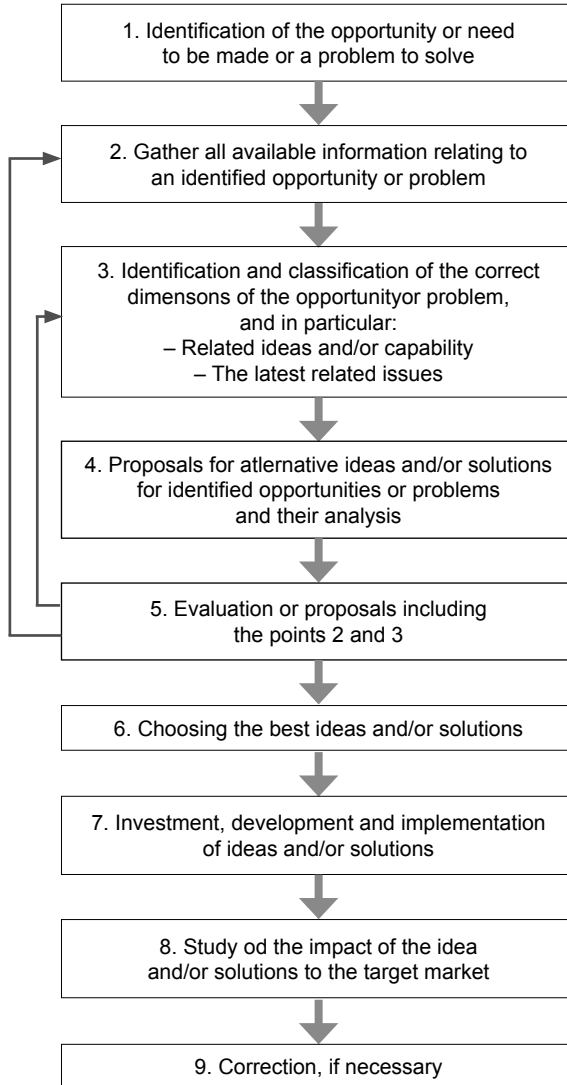


Figure 13.4. Creativity in the innovation process

Source: own elaboration based on P. McGowan (1987), "Creativity and innovation," [in:] D. Steward (ed.), *Handbook of Management Skills*, London: Gower Publishing Ltd., p. 490.

The process of globalization and the progressive computerization of the flow of information make the area of creativity and idea generation more important. Today's corporations use ideas management information systems, which are used to stimulate creative thinking and allow the acquisition, evaluation and selection of ideas for further development in the process of innovation. Acquisition of ideas, their management and the emergence of ideas for implementation has become an

area in which many companies have arisen providing specialized services, included in the creative industries. The need for continuous, permanent (Morris, 2006) development of innovation in the enterprise and society also requires the exploration of ideas continuously, and is an extension of the supplier– recipient relationship in favour of partnership, to create a space for the exchange of information as to the ideas and suggestions from partners, buyers of the product who in this way gain influence on the shape of the product they purchase. The manufacturer gains a source of ideas, which they examine, and select those that will enter development as product innovation. In the group of partners, the manufacturer also gains a group of regular customers. This kind of phenomenon is observed increasingly frequently, e.g., in the practice of the functioning of IT companies, it refocuses the supplier–customer relationship for the provision of complex forms of services comprising the continuous development of innovative products. This leads to the concept of building an ecosystem of innovation in the corporation, whose central element is an innovation process that develops continuously. Because creativity bears ideas, and these in turn are a source of innovation, therefore an important issue becomes their continuous acquisition. In the face of the increasing complexity of innovative products, a problem arises in the collaboration between professionals from different fields of science and technology as well as companies, universities and R&D centres. Looking at the economy as an environment for the development and deployment for innovation, where diverse knowledge is used, is at the same time concentrating on creativity, which is a catalyst for the development of science, technology, competence, abilities and skills, the more effective it is, the closer to balanced cultural characteristics, and therefore gender.

13.3. Why Innovative Gender

As has been mentioned earlier, innovation has been given a prominent role in the new Europe 2020 Strategy and in one of its “flagship initiatives,” the Innovation Union. Recruiting and retaining women in scientific and technical fields is seen as a key to success for the 2020 Strategy. A number of studies and reports have stressed the acute problem of women’s under-representation in science in the business enterprise sector. Whilst women represent over 35% of all researchers in the higher education and government sectors of most European countries, this is not the case for the corporate sector. The percentage of female researchers in the business enterprise sector is less than 25% in most countries (Europe, 2020). Yet another flagship initiative under the 2020 Strategy, the New Skills and Jobs Agenda, focuses on the need to modernize labour markets, increase labour participation and match labour market and skills. Studies show that the European labour shortage is likely to have more effect on female or male dominated occupations than on less divided sectors (European Commission, 2009). Occupations

in healthcare and ICT are already affected by the shortage of professionals in Europe. For example, the rapidly growing demand for ICT specialists was one of the motivators behind the European Code of Best Practices for Women and ICT launched by the European Commission (Vinnova, 2011, p. 20). Organisations that have signed the Code include global corporations like Google, Cisco and Microsoft and research institutes like the Research Council of Norway. There is considerable interest in the design of new measures to get more women involved in technology as well as innovation processes in the business enterprise sector. This will tackle the demographic challenge and achieve innovation results. A European dialogue is underway linked to the innovation case for gender diversity. This dialogue is reflected in policy, practices and various programmes providing funding for cluster initiatives. Equal participation of men and women is essential for Europe to exploit the full potential of innovative strengths – not only for demographic reasons, but also in case of innovation processes and results. There is a need to clarify what (new) cluster policy relate measures can support the process to get more women involved in the innovation process of business and research.

Observation of many innovation exercises show that optimal innovation occurs when there is an equal mix of men and women using a systematic process (SIT, 2011). Because when a predominately male group tries to innovate, results are less impressive. And, when a predominately female group tries to innovate, results are less impressive. But put them together and the results are amazing. Research in this area may have some suggestions why (Millward and Freeman, 2002). The essence of the research is that, while men and women are equally innovative, their gender role within the context of an organization can affect how they are perceived and how they behave when innovating and sharing ideas. Men are perceived as more innovative and risk-taking, and women are perceived as more adaptive and risk-adverse. Thus, gender roles may interact with the role of the manager to inhibit (in the case of women) or facilitate (in the case of men) the likelihood of innovative behaviour. The results of the research suggest that innovative solutions were attributed more often to a male than a female manager, whereas adaptive solutions were attributed more often to a female than a male manager. Men are expected to take more risks when innovating and sharing ideas. Failure is less damaging to men because that's what's expected of them. Women are expected to be less risky, and this appears to limit or constrain both their degree of innovation and their willingness to share it. Failure is more damaging for women so they behave more adaptively in innovation exercises. There is both a negative and a positive side to this. On the one hand, innovation workshops need a process to assure that women feel they can innovate "bigger" and share those ideas with the group. If, as the research suggests, women are more likely to hold back, then the facilitation approach has to break through it. Otherwise, one can lose the inherent value of the (equal) innovation talent they bring to the table. On the positive side, these differences can be beneficial. This more adaptive behaviour in women and more risk-taking behaviour in men provides a certain balance or harmony during innovation, is a complementary effect that seems to yield better results. Means that

each partner holds the other accountable for ideas that are, at the same time, novel but adoptable. Working in pairs, men and women also do a better job of expressing jointly-developed new ideas that may help overcome risks that women may be feeling. Workshop processes that pair men and women up to take advantage of this are going to be more fruitful and differential role expectations did not have an impact on the production of actual solutions. The findings are discussed for their potential to complement existing research on role expectations and innovation as well as their implications for the development of a new research agenda. In this project the equal role of gender in the innovation process is called Innovative Gender. In simplest terms gender is *a concept that refers to the social differences between women and men that have been learned, are changeable over time and have wide variations both within and between cultures* (European Commission, 1998). The previously mentioned characterization of changes in the perception of innovation, strengthening the criterion of creativity, multidimensionality, and balancing the need for cooperation and balance, and also the gradual transition from a closed to open, leads to the concept of the innovation genome (DeGraff and Quinn, 2007), which may be a map of areas of research for Innovative Gender (Figure 13.5). The innovation genome is composed of four squares, which are the areas of the innovation system, such as:

- cooperation,
- creativity,
- competition,
- control.

In each of the squares practical ways are characterized to create various forms of value. The strengths and weaknesses in each of these areas and their mutual interaction determine the ability of an organization to create innovation in certain economic, social, and political conditions (DeGraff and Quinn, 2007, pp. 9–10). Each of the four areas has appropriate metrics for the measurement of the effects achieved, their own environment, recognized handling practices in the organization, and teams, or delegated leaders. The central element of the innovation of is to create value using people in all possible areas simultaneously, which is based on the following formula (DeGraff and Quinn, 2007, p. 11):

$$\text{PEOPLE} + \text{PRACTICE} = \text{INTENTIONS}$$

Where:

- *intentions* – means the goals sought by the people,
- *practices* – means any action and values considered important by those involved in the realisation of the intentions,
- *people* – all the people involved in the efforts for the achievement of intentions.

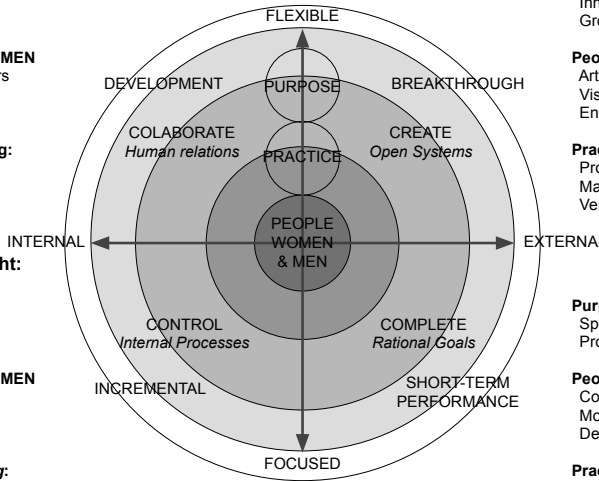
In using the innovation genome model to study Innovative Gender, the starting point may be to build four dedicated matrices filled with information (variables)

Do things together:

- Purpose**
Knowledge
Community
- People WOMEN & MEN**
Community builders
Teachers
Counselors
- Practice Incubating:**
Workplace
Values
Learning

Do things right:

- Purpose**
Efficiency
Quality
- People WOMEN & MEN**
Problem solvers
Engineers
Professionals
- Practice Improving:**
Systems
Structures
Standards



Do things first:

- Purpose**
Innovation
Growth
- People WOMEN & MEN**
Artists
Visioners
Entrepreneurs
- Practice Inventing:**
Products
Markets
Ventures

Do things fast:

- Purpose**
Speed
Profits
- People WOMEN & MEN**
Compilers
Motivators
Dealmakers
- Practice Improving:**
Performers
Initiatives
Acquisitions

Figure 13.5. The genome innovation model as a map of areas for Innovative Gender
 Source: J. DeGraff, E. Quinn (2007), *Leading Innovation*, New York: McGraw-Hill, p. 12.

describing the area of gender. On the basis of the experience, it can be demonstrated that the key to creating value in the model of the innovation genome is one of its elements, namely cooperation. In the practice of economic, political and social life, the essence of cooperation between the sexes in the idea of the team has been lost, while subordination based on dependence dominates. The call by feminists for the introduction of quotas will not solve the problem, it can only structure the workers, political, or social groups; however, a group is not identical to a team. In a group, even with an equal number of women and men, functional subordination may still apply, while in a heterogeneous team the optimal potential accumulates, providing economies of scale and synergies at the same time. Millward's and Freeman's experiments cited above clearly showed how fruitful research involving men and women together in the research team, not just women or just men, can be.

Multidimensionality and the wide range of areas shown in the innovation genome demonstrate, it is true, that all members of the organization and selected experts from co-operating organizations are committed to the process of innovation; however, for the time being it does not take gender into account. It is possible to extend it with these aspects, and the innovation genome acting as a basis for Innovative Gender can then illustrate the innovation process model taking into account all aspects of such a broad spectrum, including the importance of gender. For now we have shown "the path to innovation," composed of seven stages,

defined very broadly as the participation of all members of the organization in the pursuit of innovation, which takes into account the values associated with the culture of the organization, the individual, the creation of a vision, practices and behaviours, and traditions which are accepted by members of the organization. In this sense, the “path to innovation” is more in the nature of an agenda, but it is open to new research topics, according to the statement:

What innovation is really about is questioning what is taken for granted – challenging the norms - and finding new pathways are things. In challenging the norm, we need a critical perspective and undoubtedly a gender perspective can be helpful (Vinnova, 2011).

Innovative Gender determines the equality of women and men in measurement, opportunities and situations included in the innovation genome model. The issue of gender is assumed in a general range as equality of access to education, equality before the law, equal pay, equal access to employment, equal access to training, equal access to career advancement, equality in working conditions, equality in social security, in the exercise of social and political roles, equality in job security, equality of access to maternity and parental leave, in a given socio-economic system is already maintained, and any gaps in this area can be neutralized institutionally. It remains only to assess the involvement of the “gender resource” in the innovation process and its impact on the results. In this regard, however, there are significant multivariate differences created by gender, which should be considered only in a positive sense, because from them comes the possibility of achieving synergy as a result of cooperation of research or business teams in the innovation process. Focusing on the differences, usually in studies taken as the basis for claims arising out of the various dimensions of gender discrimination, is not under consideration here. In the Innovative Gender approach, it is more about process changes, in which the creation, implementation and dissemination involve various teams of cooperating men and women belonging to different social groups, whose participation in the team can be either professional (scientists, researchers, engineers, etc.) or quasi-professional, where participants in this process are social workers, creating changes and disseminating their results, or politicians securing such processes institutionally.

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