

Quadruple Helix as a Way to Bridge the Gender Gap in Entrepreneurship: The Case of an Innovation System Project in the Baltic Sea Region

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Abstract In most developed economies there exist a clear gap between men and women in terms of prevalence of entrepreneurial activity. The gender gap can be traced back to the general perceptions of gender in society, where entrepreneurial venturing is culturally defined as a masculine activity. In this paper, we analyse how such gendered norms are brought into Triple Helix innovation system models, and identify roles and challenges of NGOs in the alternative conceptualization of Quadruple Helix. Based on an exploratory case study of a Quadruple Helix innovation system project in the tourism industry, we find that NGOs may fill four roles in bridging the gender gap: (1) collaborative platforms for women-led SMEs, (2) legitimating and linking women-led SMEs to governmental and academic actors, (3) developing competences and process innovations related to entrepreneurial venturing outside traditional Triple Helix constellations and (4) carrying individual and societal aspects of entrepreneurship.

Keywords Entrepreneurship · Innovation systems · Gender gap · Quadruple Helix · Civil society organizations

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Introduction

Innovation and entrepreneurship is increasingly regarded as an indispensable factor behind growth and societal development. Much of the strong legitimacy of entrepreneurship in modern society rest upon the general notion of entrepreneurs and innovators as having a crucial role in society in putting all their energies into innovative actions that will lead to prosperity and growth [45, 51]. This notion is heavily supported by governmental and societal discourses, which tend to present entrepreneurship as indispensable—and often threatened—in society [47].

At the same time, research has repeatedly shown that entrepreneurship and innovation is not equally available for everyone and that some categories of the population are under-represented in entrepreneurial activities. In this paper, we build on a long tradition of critical gender research, according to which men and women have different opportunities to participate in entrepreneurial activities (cf [3, 9, 10, 54]). A ‘gender gap’ can be discerned across Europe—often portrayed as a statistical pattern showing differences in prevalence of entrepreneurial activities between the categories of men and women [4]. These differences appear both in early stage entrepreneurial activities (i.e. starting new firms) and among owner/managers of established businesses. Both early stage entrepreneurship activities and the prevalence of ongoing businesses that has proven to be sustainable are indicators of the dynamic entrepreneurial propensity and milieu of the economy. Significant differences between various categories of the population thus indicate untapped potential and unexploited opportunities [4].

The statistical gender gap is in turn a consequence of general perceptions of gender in society, where entrepreneurial venturing and innovation work are culturally defined as masculine activities [24, 49]. When entrepreneurs and entrepreneurship are described and discussed, traditional masculine characteristics tend to come in focus, dichotomising entrepreneurs from non-entrepreneurs along established gender patterns [3, 11]. Moreover, the practical expectations on entrepreneurship and innovation from policymakers emphasize high-tech, high-growth, individualist ventures—i.e. traditional masculine ways of entrepreneuring [7]. Behind the statistical gender gap in entrepreneurship, there is thus a cultural gender gap.

This cultural gender gap of entrepreneurship also permeates societal models for organizing and supporting entrepreneurial activities [49]. During the last decade, the role of collaboration between different sectors of society in supporting and catalyzing entrepreneurship and innovation has been emphasized through the introduction of the Triple Helix model [20, 34, 44]. In this model, successful entrepreneurial activities and innovation work in established firms are seen as dependent upon the effective interplay between private businesses, governmental agencies and academic institutions. At the same time as this model is increasingly used as a conceptual framework in supporting entrepreneurship in several Western countries (cf. [19, 21, 29, 32]), there is also research indicating that the gender gap has neither been addressed nor reduced [49, 59]. Triple Helix innovation systems tend to emphasise and sustain traditional masculine notions of entrepreneurship and innovation—not least since publicly supported Triple Helix initiatives also tend to be situated within male-dominated settings of networks and industries [36, 48].

A situation in which dominating policy models sustain the gender gap in entrepreneurship through an inherent gender bias [49] imply both practical and theoretical challenges for research. From a practical viewpoint, the continued prioritisation of men's business venturing in societal innovation programmes is problematic both from democratic and efficiency-based perspectives, where both the fairness and the rationality behind policies that are biased towards certain parts of business life can be questioned [16]. From a theoretical viewpoint, there is a need to critically investigate the norms and consequences of dominating policy models such as Triple Helix from a gender perspective and to offer alternative conceptualisations (in line with, e.g. [8, 29]). Guided by an ideal of critical performativity—involving active and subversive intervention into managerial practices and discourses (cf. [52])—we intend to analyse the norms and consequences of current models. In this, we are inspired by the existing critical theoretical tradition of gender and entrepreneurship (cf. [3, 10, 11, 39]). Hence, we aspire to analyse how the gender gap in entrepreneurship can be bridged through alternative conceptualisations of societal innovation system models.

In the recent debate, an extension of the Triple Helix model into a Quadruple Helix model—including civil society besides the industry, state and academy—has been proposed to overcome the problem of marginalisation in innovation policies [12, 13]. In these proposals, civil society appears in several and different ways: as citizens, as consumers, as various forms of non-governmental organizations [5, 12, 13, 25, 31, 38, 41]. While all these aspects of civil society are certainly relevant to the understanding of societal innovation processes, the active inclusion of civil society in innovation systems programmes and projects usually tend to take place through various forms of intermediate organisations that play significant roles in linking governmental, academic and industrial organizations to each other [15, 30]. In the current study, we have thus focused our attention to organized intermediate civil society actors such as non-governmental organizations, NGOs.

The Quadruple Helix initiatives have recently materialised into a number of pilot projects in which civil society organizations are intentionally involved in the organisation of innovation systems [36, 38]. Drawing upon both specific experiences from equality work within entrepreneurship and a general critique of the functionality of traditional Triple Helix constellations, the advocates of Quadruple Helix models claim that the gender gap in entrepreneurship might be bridged if marginalised actors and areas are linked to each other and given better access to governmental and academic resources [38]. This process of inclusion is suggested to be enhanced by intermediate civil society organizations.

In this paper, we intend to analyse the gendered norms and consequences of dominating innovation models, such as the Triple Helix, in relation to the gender gap in entrepreneurship and to identify roles and challenges of NGOs in the alternative conceptualization of Quadruple Helix. Extant research problematising Triple Helix constellations has indeed pointed at the need for intermediary organizations to enhance intersectorial collaboration [6, 8, 29, 30], but usually without challenging the Triple Helix framework as such or attending to gendered aspects of entrepreneurship and innovation.

We will do this by studying the practical implementation of a project promoting regional Quadruple Helix innovation systems in the Baltic Sea region tourism industry, striving to counteract the gender bias of dominating policy models and

proposing that non-governmental organizations (NGOs) play a central role in promoting gender-inclusive entrepreneurship and innovation. By this study we want to contribute both to the emerging literature on Triple and Quadruple Helix innovation systems and to the literature on gender and entrepreneurship by describing how Quadruple Helix constellations may work in practice and what specific problems that are involved in enhancing the quantity and quality of women's entrepreneurship.

The paper is organized as follows. First, we discuss the gender gap in entrepreneurship and identify several aspects of entrepreneurship as a masculine construction. Then, the theoretical development from Triple Helix to Quadruple Helix innovation system models is described—identifying the roles of NGOs as central in understanding how gender gaps can be bridged in innovation system work. Then, an in-depth exploratory case study of the Quadruple Helix Central Baltic is presented along a number of themes related to the relations, the roles and the challenges of Quadruple Helix settings. The paper ends by a concluding discussion on the possibilities of bridging the gender gap in entrepreneurship through the inclusion of NGOs in innovation system models.

The Gender Gap of Entrepreneurship and Innovation

According to a long tradition of research on gender in organisations, gender can be understood as a constitutive aspect of organizational processes and organizations [1]. Gender is then regarded as an ongoing construction of femininity and masculinity, and as a perspective it relates everyday practices and activities to institutional and structural levels of analysis [22, 57, 58]. At a structural level, this leads not only to segregation—e.g. on the labour market—but also to hierarchies where areas associated to 'men' and 'masculinity' often are ascribed higher value and status—manifested, e.g. by higher wages and faster careers. In practice, this implies an uneven distribution of power and resources between women and men—not least in areas such as entrepreneurship and innovation that tend to be promoted as desirable and admirable in society [10, 11, 24]. This ongoing construction of segregating and hierarchical gender categories is present in public promotion of innovation in Swedish policy programs targeting innovation systems and clusters [16]. In these policy programs, gender is done when distinguishing different actors and industries, ascribing them different value in relation to innovation and growth [49].

The aspect of change is central to the gender perspective, as the focus on everyday practices also underlines the possibility of doing things differently [57]. It is quite possible to act in ways that break with taken-for-granted norms, opening up for alternative cultural patterns, policies and practices. Concerning public promotion of joint action networks for innovation, such a change in the doing of gender could imply that sites of innovation are decentred “from singular persons, places and things to multiple acts of everyday activity” ([53], p 1).

The statistical gender gap of entrepreneurship has been subject to several studies in recent years. According to the Global Entrepreneurship Monitor 2007 report [4], the gender gap is clear and also stable over the years. In high-income countries (most EU countries fall into this category), 8.17 % of the male population and 4.34 % of the female population start firms; 7.91 % of the male population run established own firms, and 3.57 % of the female population. In low and middle income countries, the

gap is narrower where start-ups of new firms are concerned, but the same in the stock of established firms. Roughly, men are thus twice as likely to start up or run a business of their own. This structural problem has been subject to governmental and voluntary interventions across the globe for decades, from initiatives such as Grameen Bank and Hand in Hand in developing countries to e.g. Women Resouce Centres in Sweden [27, 33, 38]. As argued above, the gap can be traced back to certain cultural constructions of masculinity and femininity in society that is present also in the context of entrepreneurship and innovation (cf. [36, 43, 54]). The following aspects of the cultural gender gap in entrepreneurship and innovation have been highlighted in earlier research studies:

- Perceived necessity of entrepreneurship more important for women than for men. Can imply that women to a larger extent will refrain from starting businesses unless perceived as necessary for survival [54].
- Entrepreneurship as a masculine activity in masculine sectors. Nowadays, the entrepreneur is constructed in society as the heroic saviour of the modern economy [51]. The role models presented in mass media are often tough, decisive, growth-oriented billionaires, working within material- and technology-intensive sectors. Women, who already by education and employment are more likely to be found in other sectors and expecting their businesses to be a stable source of modest income, may feel estranged to the concept and stereotypes of entrepreneurship [11].
- Less usage of and less access to venture capital among women, based in a mutual reluctance of women and financiers to engage in venture capital negotiations (cf [42]). Many women as entrepreneurs do not fit into the stereotype of the masculine entrepreneur expected by the venture capital providers, and they also expect to be seen as deviating—as women and also often as representatives of less interesting sectors of the economy [14, 46]. According to [35] female entrepreneurs might even try to conceal or avoid issues deviating from established masculine norms in order to gain acceptance as ‘real entrepreneurs’.
- Entrepreneurship as integrated with family life. Women entrepreneurs are part of cultural norms emphasizing women as responsible for household matters. This means that it is hard not to see the possibilities of integrating family and business life as a main issue in women’s entrepreneurship [9, 54].
- Smaller and more local social networks of women entrepreneurs. The importance of social networks has since long been emphasized in entrepreneurship research. There are indications that women often have smaller networks consisting of closer relations, and that this may be problematic in an economy where large-scale networking is important for the possibilities of perceiving opportunities and collaborating with knowledgeable actors [18].

From Triple Helix to Quadruple Helix—Towards the Inclusion of NGOs into Innovation System Models

The concepts of Innovation Systems and Triple Helix reflect the fact that innovations increasingly have come to be regarded as dependent on a surrounding system of institutional and cultural norms. That is to say that innovation is believed to occur

through interaction networks supported by laws, rules, standards etc. In research, this systemic view on innovation and innovation policies was widely adopted at the end of the 1980s and early 1990s [19, 44]. However, it is not primarily a broad system approach that has been applied in research and policy. Instead, a narrow view on the innovation system concept has dominated, focusing research-based innovation, formal technical infrastructure and market-driven research [23, 40].

According to [32], the innovation system concept originally built upon a Double Helix emphasized the interplay between academy and industry, ascribing the state a minor role in the development of innovations. The Triple Helix concept was introduced by [20] as a critique of the Innovation System concept, highlighting government as an important actor in joint action networks promoting innovation, besides the academy and industry.

As the innovation system concept has increasingly been applied to the regional rather than national level [44], the view of the governmental actor has changed and widened. Analyses of empirical data concerning the formation of joint action networks in Sweden promoting women's entrepreneurship and innovation expose how these can be interpreted in the light of a broad approach to the innovation system concept [36, 38]. Rather than engaging solely the industry and the academy, as in the narrow approach of Double Helix, they have involved actors in central, regional and local government as well, as in the broader approach of Triple Helix.

In the current theoretical debate, several scholars have pointed at the need for a further broadening of the Triple Helix concept towards the inclusion of organizations bridging the gaps between actors. In a study of university–industry collaboration, Bjerregaard [6] point at the problems of differing institutional/cultural logics in Triple Helix settings, implying the need for new ways of organizing intersections between the helices. Brännback et al [8] claim that Triple Helix models tend to favour the involvement of established firms rather than entrepreneurial ventures, suggesting the introduction of 'liaison-animateur' organizations that can link ideas, people and resources together. Johnson [30] emphasise the need for intermediate organizations that bring Triple Helix partners closer together, providing the case of a consortium supporting and orchestrating collaborative R&D projects. The consortium fulfils roles such as mediator/arbitrator, sponsor, filter/legitimator, technology broker and managerial expertise—thereby enabling and improving collaboration between its academic, industrial and governmental members. In a similar vein, Cornett [15] claim that different types of intermediate organisations are needed depending on what collaborative relation that is at hand—emphasising the need for consultants and technological institutes as liaisons between enterprises and the academic sector, and various forms of NGOs as linking enterprises with governmental actors.

From their study of two cases of structural change in traditional industrial regions, Jensen and Trägårdh [29] suggest that Triple Helix models tend to work less successfully if applied to weak and declining regions, due to simplistic solutions, ill-defined problems and blurred actor roles. They describe the Triple Helix model as blind to the conditions of contracting economies, as merely a rhetorical construct when active government and prestigious universities are not present. The proposed solution is to bring in civil society into such action programmes, to mobilise local cultural ties and connections, to introduce bottom-up, social policy drivers along with economic top-down ones (cf also [28])

The contributions of [8] and [29] point at that Triple Helix is not sufficient as a basis for analysing and understanding innovation systems. Here, we will take their reasoning further by explicitly adding a fourth actor category—implying a Quadruple Helix model. The Quadruple Helix concept can be found in several recent academic publications, but with different emphasis [31]. Carayannis and Campbell [12, 13] suggest that the fourth helix is the societal elite of well-educated, well-informed consumers that participate in innovation systems by being active, demanding and imaginative. A similar emphasis can be found in the works by Arnkil et al [5] and Galbraith et al [25] who claim that the user of complex ICT systems is actually also a co-developer in the modern world of open source innovation. The common denominator of these contributions is that they basically regard the Triple Helix model as well-functioning, but blind to the role of the active “prosumer” [55] that is an integral part of modern technological development. In recent writings (cf [13]), there are even examples of how a fifth helix has been added, in the form of the natural environment of society (Quintuple Helix) or by dividing the fourth helix into the voluntary sector and individual societal entrepreneurs (Penta Helix).

Bridging the Gender Gap? NGOs as the Fourth Helix

In this paper, we base our Quadruple Helix conceptualisation on how a fourth group of actors have been central in the formation of regional joint action networks, namely the non-profit sector [36, 38]. This sector is constituted by NGOs running their activities in a non-profit manner, thus reaching beyond the borders of commercial enterprises, political institutions and scientific research. What these civil society actors seem to contribute is a complementary function, securing both the survival of the network’s member organizations as well as the realisation of projects not fitting the organizational logic of the university or the public financiers. Moreover, the civil society actors are important in the knowledge development, shaping the organisational strategies somewhat differently compared to the emphasis upon universities within the Triple Helix model.

The general gender bias in entrepreneurship and innovation research and practice seem also to characterise Triple Helix initiatives [16, 36, 38, 59]. In these works, the fourth pillar of Quadruple Helix that may serve as a bridge over the gender gap is not only related to NGOs in general, but also to women’s organisations in particular. Taking a Swedish perspective on the role of NGOs in bridging the gender gap in entrepreneurship, they specifically analyse the category of Women Resource Centres (WRCs), many of which are organised as—or involving—NGOs. Such centres were established all over Sweden as a result of the Swedish government initiating public funds for this purpose. The aim of the public funding of WRCs was initially to increase women’s participation in regional development policy development and implementation. Later, the aim was reformulated to attain gender equality in regional growth policies by highlighting women’s life circumstances and by increasing women’s influence. The WRCs in Sweden have operated with a double strategy of support and counselling to individual women and strategic actions intended to evoke structural change in regional growth policies. WRCs have thus served to bridge the gender gap of entrepreneurship and innovation. Existing research depict how WRCs systematically have organised themselves at the local, regional and national level in

Sweden by linking public, private and non-profit sector and academia around different topics such as entrepreneurship, labour market participation, new technologies (e.g. ICTs), services and creative industries (cf. [37]). WRCs have also been established throughout Europe, coordinated by the joint association Winnet Europe [38].

Our exploration of the Quadruple Helix model is thus based in a critique of the discriminatory effects of the dominating innovation policy models—i.e. that they neglect gender as a societal structure and as a result tend to sustain the traditional masculine dominance in innovation and entrepreneurship [7, 24, 49]. As exposed by [36], the major part of publicly promoted innovation systems and Triple Helix constellations in Sweden relates to actors and areas in a masculine, industrial and high-tech setting. The partially biased Triple Helix model is illustrated in Fig. 1.

In our conceptualisation of the Quadruple Helix, we thus relate to the view held by [2, 17, 29, 41] where the focal interest in conceptualising and developing the notion of a fourth helix is non-governmental organizations. In the Quadruple Helix model, it is not only the commercial, political and theoretical parts of innovation systems that are regarded to be of interest, but also the non-profit aspects. In its multitude of actors, areas and aspects, the Quadruple Helix model partly overlaps with Lundvall’s [40] notion of a broad approach to innovation systems, emphasising the importance of people, skills, relationships and interactions besides the importance of basic research, workplace development and low technology sectors. NGOs with limited financial resources are seldom perceived as key actors in the partnerships for local and regional growth in Sweden [36]. A broader approach to innovation systems, as e.g. manifested by the Quadruple Helix, acknowledges the important role of civil society and the non-profit sector and might bring about a change in the view of the contribution of NGOs within regional growth policies and innovation policies (Fig. 2).

Empirical Case Study: the Quadruple Helix Central Baltic project

The empirical data in this paper was generated in interviews and seminars in the *Quadruple Helix Central Baltic* project, running 2009–2011 and involving eight

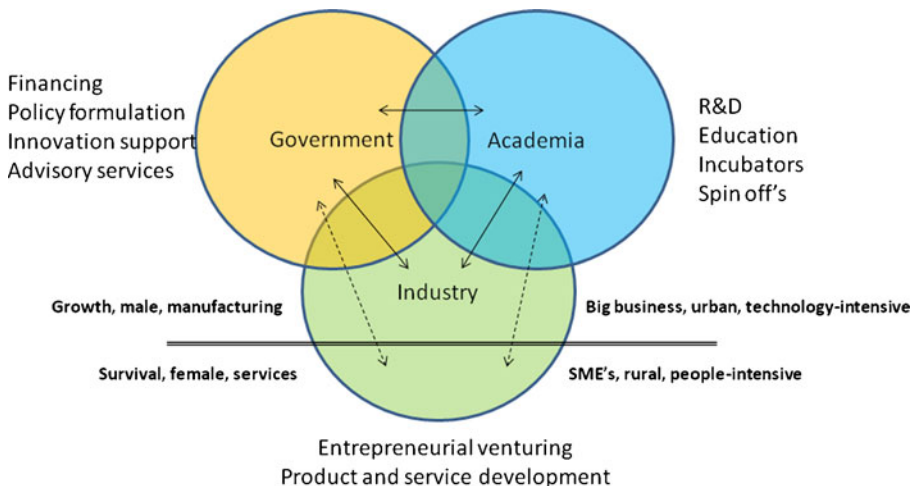


Fig. 1 The partially blind Triple Helix model

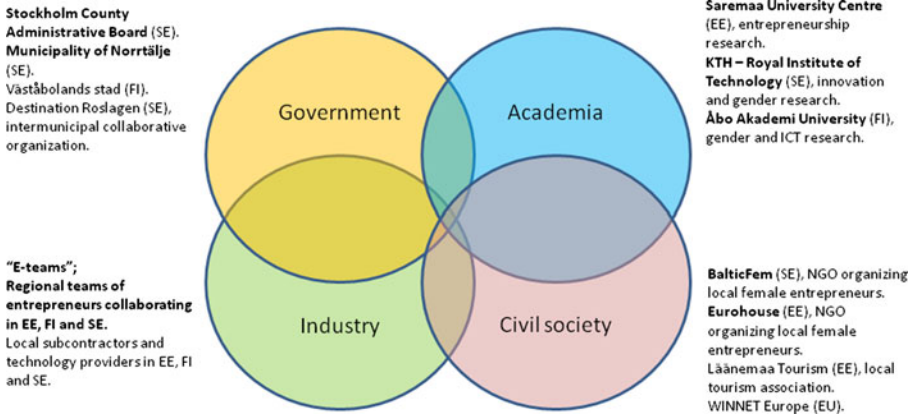


Fig. 2 The Quadruple Helix Central Baltic project. Formal project partners in **bold**. *EE, FI* and *SE* are the official European Union acronyms for Estonia, Finland and Sweden

partners from three countries: Estonia, Finland and Sweden. The project was funded by the European Union Central Baltic INTERREG IV-A programme. Intentionally set up as a Quadruple Helix constellation, the project focused on gender equality, entrepreneurship and ICT innovations—inviting family- or women-owned small tourism businesses in three Baltic archipelagos to participate in an interactive development of ICT-based business support systems.

The overall aim of the project was to stimulate clusters in the tourist sector alongside development of innovation support measures and implementation of methodologies for gender mainstreaming in cluster processes. Activities targeting entrepreneurs in the tourist sector is thus combined with activities targeting regional partnerships, tourism and business promoters as well as decision makers. Entrepreneurship and innovation in the tourist sector were promoted by the project with a specific focus on micro enterprises (0–10 employees) and women-led businesses. Different mobile technology applications for the tourist sector were further developed within the project, acknowledging the needs expressed by the entrepreneurs, innovators and end users.

The tourism sector is generally held to be of vital economic importance to local and regional communities. At the same time, earlier research has questioned the innovative potential and capacity in the industry, especially where small businesses are concerned (cf [26]). Small tourism enterprises are usually not seen as capable of radical innovation, instead relying on traditional products and services, delivered and marketed by established technologies and channels, populated by a low-educated and less-creative workforce [56]. When reviewing possible ways of supporting and enhancing innovative work, Hjalager [26] point at the importance of regulatory and infrastructural changes, organisations concerned with collecting and disseminating knowledge, and technological developments. Furthermore, Thomas et al [56] and Skoglund [50] point at the widened possibilities for inter-firm collaboration and shared marketing channels opened up as a result of information and communication technologies being adopted by small firms. Many of these aspects require interaction between firms, but also with governmental agencies providing regulations and support and academic institutions providing practical knowledge.

Following this reasoning, interactions between the four helices in the project were designed based on pre-conceived notions of what each helix could contribute to achieve project targets. As the practicalities of the Triple Helix model are well documented in literature, the contributions of each of these three helices have been specified from the start. Public sector organisations were expected to contribute with financial resources, policy making, innovation system support and business advisory services. The academic sector provided technologies related to products and services (in this case ICT-based solutions to increase the visibility of tourism firms to their customers), and knowledge on innovation systems, business clusters and other forms of collaborative practices. Academia also provided training and education, as well as access to business incubators and research spin-offs. The small firms were to run and develop their businesses, using the support structures provided by the two first helices. By introducing the civil sector in the guise of NGOs, the project aimed at improving the relations between the other helices and establish regional and transnational business collaborations, such as alliances, co-branded destination services and industry clusters.

Below, we analyse empirical data based on a longitudinal process study of the interactions in the *Quadruple Helix Central Baltic* project. The data was collected by two of the authors of this paper and three research assistants, through semi-structured interviews, participant observation and dialogue seminars (see Table 1). In the dialogue seminars, representatives from all four sectors of the Quadruple Helix constellations participated. While the interviews aimed at understanding how individual actors worked on a daily basis and perceived their relations to others, the dialogue seminars were intended to bring out both shared and diverging interpretations between the actors. We also participated in project partner meetings as well as in workshops where the actors undertook joint business development—for example by collaborating on a co-branded tourist trail supported by mobile ICT applications. Interviews were recorded and transcribed, dialogue seminars documented through protocols, and meetings through protocols and field notes. As the empirical study is limited to one specific Quadruple Helix initiative (albeit including three regional four-party collaborations), it should be read as an exploratory study aimed at identifying possible aspects of Quadruple Helix models in bridging the gender gap of entrepreneurship. Further case studies on such settings are needed if stronger claims of validity are to be made.

The empirical research questions relating to this paper were related to the possibilities and challenges involved in bridging the gender gap in entrepreneurship and innovation through a Quadruple Helix approach—with a focus on what the fourth helix, the NGOs, could contribute. These possibilities and challenges were summarised from interview and dialogue seminar data explicitly aimed at understanding the relations between different helix actors and the relevance of NGOs in improving these relations.

Relations, Collaborations and Conflicts Within the Quadruple Helix Setting

Concerning the relations between the actors in the project, the partial blindness of Government and academia in relation to small, female-led businesses was a common theme. Most relations between government actors and small businesses had

Table 1 Overview of data collection 2009–2011

Geographical area	Data collection activities
Estonia	2010: 6 interviews with female entrepreneurs 2011: 23 interviews with female entrepreneurs
Finland	2010: 8 interviews with female entrepreneurs
Sweden	2009: Documentation of 1 search conference and one dialogue seminar 2010: Documentation of 2 dialogue seminars, interviews with 5 female entrepreneurs 2011: 14 semi-structured interviews with local politicians, tourism agency officials, NGO managers and female entrepreneurs
Cross-border (all three nationalities present)	2010: Documentation of 2 dialogue seminars with local politicians, tourism agency officials, entrepreneurship support agency officials, entrepreneurship researchers, NGO managers and female entrepreneurs 2011: Documentation of 3 dialogue seminars with local politicians, tourism agency officials, entrepreneurship support agency officials, entrepreneurship researchers, NGO managers and female entrepreneurs

developed on local levels, but were characterised as incomplete and often missing the point. Most interactions related to issues of inspection and compliance, and the business owners found it hard to come into contact with business advisory services and to navigate between multiple contact points.

The attitude is neutral. Some are supportive, some are not. For example, our local Health Protection Board is very supportive. The Tax Board is not really supportive, they are rather a control institution, not supportive. The Tax Board should give advice to starting entrepreneurs. At the moment, you have to find out everything by yourself and even then you might not know everything. When they check on you and discover a mistake, they fine you right away, there is no previous consulting. (Female entrepreneur, Estonia)

They also made repeated claims that civil servants did not understand the conditions for running small businesses very well, as they tended to think of private companies in the same way as of their own organisations—stable, resourceful, well-staffed. Local government actors found it difficult to reach female business owners as they were often outside established networks such as Rotary Clubs and in general not spending much time away from home (where their businesses were usually located). They also tended to focus on a few large enterprises rather than many small ones.

Similar descriptions were given on the relation between small businesses and academia. Interaction with universities and research institutes were seen as very time consuming, and the small business owners found it very hard to come into contact with the right experts due to the universities' inability to set up well-functioning contact points.

“Broaden the view of “Academia” in innovation system models! Sometimes you need path-breaking research, sometimes just the state of established knowledge, sometimes just vocational training. SMEs must also ask the right questions in the right way—which they are not trained for unless having academic

backgrounds themselves. Sometimes they just need information about the state of things, not cutting-edge research. Research is usually much too expensive to buy for small firms or NGO's." (Dialogue seminar protocol, Sweden)

Universities were not often interested in the problems of small businesses unless they concerned advanced technological matters, and the costs of buying research were found to be far beyond what any small (or medium-sized) business could ever afford. A common experience from both business owners and university staff was that small businesses often went to the wrong place—in most of the cases they just needed access to generic knowledge or simple mappings of market trends that could preferably be offered by high school teachers or local consultants. Quite often, the two actor categories tended to speak different languages and to ask the wrong questions.

Since our company works during summer, we could invite students from vocational schools for an internship. There could be cooperation with universities in connection with market research because when ordering this research from some companies it could be considerably more expensive. I think it would be useful for both sides, for universities as well as entrepreneurs. If you need this and the university would offer this as a service, it would be useful for both. (Female entrepreneur, Estonia)

Concerning the relations in between the category of small businesses, there were some differences between the three countries. In the Swedish E-teams, they had the experience that cooperation was a good way to increase the profitability of all involved forms—the problem was to find the time and resources to spend on collaborative projects and alliance building.

You should have no competitors, really. Of course you can go out there and try to kill each other, but I look at all competitors as collaboration partners. It is much more fun thinking that way, and if I get a really large booking, even my worst competitor, she who does exactly the same thing as I do, must be brought in to help me out. If I had not have my collaboration partners, I would not have been able to be part of the package deals. (Female entrepreneur, Sweden)

The Estonian actors understood it in a different way: they looked upon other firms as competitors and rivals, and on their own knowledge and information as something to be kept secret rather than shared. In general, small business owners were still interested in everything from study visits to long-term collaborations, but were unsure about how to start, what the best practices of collaboration were and how to find the best potential partners. Notions of trust and common values were always present in all collaborations, and they related several accounts on the reluctance to let additional firms into established collaborative arrangements.

Discussion: Bridging the Gender Gap in Quadruple Helix Constellation

From the empirical data, we could thus discern several aspects related to the role of the NGOs for promoting women's entrepreneurship and innovation in the studied project—both in terms of how NGO staff perceived themselves and in terms of what

expectations and challenges that were laid upon them. These aspects are summarised in Table 2.

First, the involved NGOs had a clear role as *collaborative platforms* for women as entrepreneurs. They were seen as arenas for non-hierarchical networking and business collaborations between individuals, projects and firms. That also implies that they could serve as ‘cluster incubators’ where systemic patterns of collaboration and competition can emerge over time. The core aspects of being collaborative platforms was the emphasis on core values such as trust, gender equality and open information-sharing, and having a common cause and agenda. Many small business owners said that they would never spend time networking unless they could see any potential future benefits.

Everything one does has to have a purpose and this is why people get together, make decisions and solve problems. When people get together just to talk or if one wants to feel superior to others, it is quite pointless. (Female entrepreneur, Estonia)

Most of the collaboration the women entrepreneurs take part in is local and consisted of a small network of a few other women entrepreneurs, often within the same field or sector (tourism) as they work in themselves. For the majority of women, the value of collaboration lay in increased visibility. Most women, who do collaborate, evaluated the collaboration as positive or valuable. Still, many expressed a desire to increase either the level of collaboration or expanding into different fields. (Dialogue seminar protocol, Finland)

Second, the NGOs also have the role of *legitimizing and linking* small businesses led by women to the other helixes. For example, they may affect the formulation of

Table 2 Bridging roles, activities and challenges of NGOs in Quadruple Helix innovation systems

Bridging role of NGOs	Bridging activities	Bridging challenges and obstacles
Collaborative platforms	Non-hierarchical networking, business collaboration nodes, cluster incubators, arena for trustful communication and information exchange, carrier of common goals and values.	Short-term financing despite long-term needs. Difficult trade-off for individual business owners between collaborating and running their own firm.
Legitimizing and linking	Promoting gender mainstreaming in legislation and business support services. Linking small businesses to authorities and academic institutions.	Questioned legitimacy due to informal practices and being ‘womens’ organizations’. Seen as competing with governmental structures. Lack of local legitimacy. Problems of creating linkages to academic organizations.
Competence development and process innovations	Competence development and process innovations related to firm categories usually excluded in Triple Helix systems.	Innovations not directly transformable into commercial products and services not valued by other helices.
Carrying individual and societal dimensions	Promoting bifocal approaches emphasising gender change as both individual and structural.	Individual and structural aspects of womens’ entrepreneurship seen as controversial and irrelevant in business communities.

governmental policies in the direction of gender mainstreaming, and connect small businesses to academic research and education. Being less formalized they were seen as able to handle different linkages in a pragmatic manner, to give voice to marginalized categories of entrepreneurs and firms in non-traditional industries, non-traditional sectors, non-urban areas and with atypical sizes and growth ambitions. The long-term ideological ambitions of NGOs are not always recognized, however:

The representatives from the NGO have been described by the e-team as very energetic regarding how to support business ideas. They stress the opportunities and not the problems. And even if the NGO has a political objective to support especially women, the interviews with the e-team showed that the entrepreneurs appreciated the genuine interest in entrepreneurship hold by the NGO. ‘It is not really gender issues that has been on the agenda, it is just that we happen to be women in this project that makes it a women’s project’. (Field note, Sweden)

Third, NGOs tend to *develop competences and process innovations* related to entrepreneurial venturing outside traditional Triple Helix constellations—becoming platforms for developing knowledge on, e.g. women’s entrepreneurship, solo venturing, rural entrepreneurship and small-scale service production. Based on this knowledge they may also become arenas for developing effective procedures of supporting entrepreneurs, collaborative practices and firms usually not considered in dominating societal models—e.g. related to business advisory services, practical cluster building, project management or researcher involvement.

We have had this idea on a common bicycle trail in the region for quite a while, but we did not really have the time or energy to get it done. The BalticFem people came as saviours, they focused on getting the project done, they structured our work, organised us entrepreneurs into different tasks, produced some marketing material and initiated the construction of the mobile telephone application that is being built at a Finnish university. When the application is ready for launch I know that people will find our companies much easier than today, my children say that no one wants those paper maps and brochures any more. We had all the material, but someone had to put it together. (Female entrepreneur, Sweden)

Fourth, NGOs were also expected to *carry the dimensions of individuals and societal structures*—such as the link between gender structures and conditions for individual women pursuing entrepreneurial ambitions—often neglected in traditional Triple Helix constellations focusing on firms and projects. Thereby, they could promote bifocal approaches to supporting women entrepreneurs, inducing change both on the individual and structural levels instead of on the former level only. The ability to combine professional business thinking with supporting local development and pursuing ideological agendas appeared as central to NGO work in this area:

As a big fan of civil society I think they can do many great things. They can lead the way, influence and shape politics, etc. There are many non-profit associations, people should belong to many non-profit associations, the wider and more diverse their world will become. Sticking too strictly to just one area might have a negative effect on seeing the “bigger picture”. (Female entrepreneur, Estonia)

Quite often, the ideological issue of gender equality tended to become subject of “silent awareness” among the collaborating entrepreneurs. On the one hand they often agreed to the idea of supporting women’s entrepreneurship, but on the other hand they primarily wanted to be recognised as independent individual entrepreneurs rather than as embedded in societal gender structures:

Even though many of the female entrepreneurs would not call it discrimination, several women said that they had experienced demeaning comments, such as “little friend”, “little girl, don’t you understand?”. Many had also experience ignorance by men, not being able to have their opinions heard. For several entrepreneurs it also seemed to be important to not see any special treatment that would be gendered. Some explicitly said that they do not WANT to notice any difference in treatment. (Dialogue seminar protocol, Finland)

In the empirical data, we also find several examples of challenges and resistance that NGOs become faced with in pursuing the abovementioned roles in the continued attempts at bridging the gender and entrepreneurship gap. In the role of being collaborative platforms they continuously face the problems of maintaining their ongoing operations on a long-term basis, beyond short-term project financing and commitments.

In their role of linking and legitimating they are often taken less seriously due to their informal ways of operating and to their character of “women’s organisations” as such—several of the studied NGOs experienced that they became scrutinized in a way that other helix actors were not, and seen as prone to initiate “disturbing” gender conflicts. Often, they were also seen as competing intruders in existing governmental structures for e.g. business advisory services—and thus, as somewhat more radical than most of their individual members. The basis of legitimacy therefore often may rest on a regional, national or transnational level rather than on a local level. They also often found it especially hard to link to other helix actors (such as universities) neither used to nor organized for handling entrepreneurial organizations—especially not small, female-led ventures.

Everything begins with knowledge. We cannot want to do things we don’t know about. We don’t know how to use science. For instance, we think that tourism is not a field where science could be used. I think a research institute could make a better suggestion for what an entrepreneur might need. We should find common ground between the wishes and needs of entrepreneurs and the possibilities of the universities. The most difficult part of cooperation is then who should improve these links. (Female entrepreneur, Estonia)

Concerning the role of competence and process development, NGOs often experienced that their results were not considered to be innovations—unless they could be commercialized. Process innovations concerned with how to support women as entrepreneurs and their collaboration and cluster building were not seen as “real” innovations.

Finally, while carrying the perspectives of individuals and societal structures, they were questioned precisely of this—allegedly attending to politically controversial

issues of cultural patterns and discrimination rather than “doing proper business”. NGOs not explicitly aiming at addressing gender inequalities may thus very well serve to sustain extant cultural patterns rather than spurring change:

I am part of a non-profit organisation, an association of entrepreneurs and there I have felt that I am not accepted or in other words, I have felt “looked down upon”. Since there are very few women there and the men have created a circle of friends amongst themselves, it is common that I cannot get a word in, I am not listened to, I cannot manage on my own, I cannot deliver my message. When talking to them privately, I can manage, but when they are together, I have problems. (Female entrepreneur, Estonia)

Conclusion: Bridging the Gender Gap in Entrepreneurship and Innovation

In this paper, the gender gap in entrepreneurship has been scrutinized by analysing gendered norms and consequences of dominating innovation system models, such as the Triple Helix. Thereto, the roles and challenges of NGOs in the alternative conceptualization of Quadruple Helix have been explored, based upon the experiences made in the project *Quadruple Helix Central Baltic*. In this endeavour, we have been guided by an ideal of critical performativity—involving active and subversive intervention into managerial practices and discourses (cf. [52]) intended to alleviate gender inequalities in entrepreneurship and innovation (cf [11]).

In this paper, we have studied how the project *Quadruple Helix Central Baltic* has strived to counteract the gender blindness of dominating policy models, proposing that NGOs may play a central role in promoting gender-inclusive entrepreneurship and innovation. Based on these discerned roles we propose a conceptualization of Quadruple Helix that includes the sectors and functions pictured in Fig. 3 below.

Our proposed conceptualization of Quadruple Helix acknowledges the importance of non-profit actors and areas alongside public, private and academic ones. It also

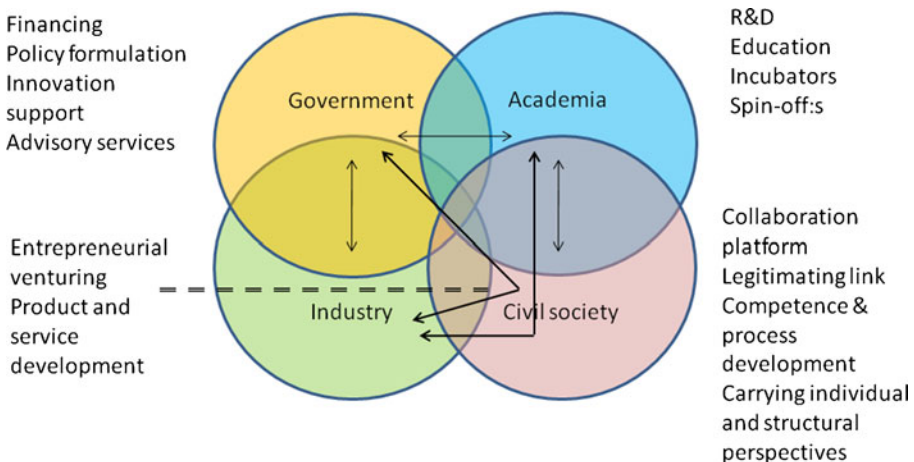


Fig. 3 Developed notion of a Quadruple Helix innovation system

addresses the challenges and resistance that NGOs have become faced with in pursuing the abovementioned roles. The roles identified goes beyond the focus on linkages in extant Triple Helix research by also emphasising the active role of the fourth helix in developing process innovations and carrying individual and structural perspectives on entrepreneurship.

The types of challenges and resistance identified reflect the implicit gendered norms permeating dominating innovation system models [16], such as the Triple Helix, where women and NGOs are not expected to be of importance [59]. By promoting an innovation system where marginalised groups play central roles, the Quadruple Helix model provides an interesting example of how to bridge the gender gap of entrepreneurship and innovation in future innovation systems initiatives. These experiences can guide future policy programs on regional growth and innovation when aspiring to create more inclusive ways of “doing entrepreneurship”.

At the same time, there are also several problematic and unresolved aspects of the case studied that relates back also to other earlier studies of innovation systems and entrepreneurship beyond traditional notions of Triple Helix (cf [6, 13, 16, 29, 30]). One such aspect is the consequences of the regionalisation of innovation system concepts [44] that tend to make weak and under-developed regions subject to the same policies as highly competitive nations and industry clusters. The Quadruple Helix model is a response to the calls for civil society involvement and emphasis in weak regions [15, 29], but is of course also a more accurate description of the collaboration patterns in prosperous regions who often tend to have well-developed ‘third sectors’. A second aspect is the ‘projectification’ of innovation system settings, treating them as simplistic time-limited, top-down solutions to far more complex and enduring problems. When subject to ‘projectification’, innovation systems activities become dependent upon external financing and it is thus hard to sustain achieved results and actor networks. In the project studied here, the issue of transferring ownership of the established ICT solutions and securing ongoing operations became a central issue for project participants once they realised that the end of the project was imminent. The issue could be resolved by letting an NGO involved in the project taking over as platform for the application, thereby perpetuating at least parts of achieved results and collaboration patterns.

A third and final aspect is the cultural norms of femininity and masculinity that are anchored in society rather than in innovation systems, and which thus tend to remain relatively stable throughout any attempt at bridging the gaps. Although innovation systems collaborations may sustain or change extant cultural gender structures, they will only address parts of the general norms on femininity and masculinity. The Quadruple Helix model may well bridge the gender gap of entrepreneurship by emphasising the roles of NGOs as collaborative platforms for female entrepreneurs, as legitimating linkages to academic actors and governmental institutions, it can hardly affect societal norms of what men and women are expected to do in their family life or in what industries and occupations they are to be expected to be found. Again, an inclusive and broad approach to innovation systems work is needed if long-term changes should be possible to achieve.

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