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# 1. Gender and innovation – an introduction

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## INTRODUCTION

Innovation has become a buzzword in policy and industry as well as scientific discourses, seen as an important element in economic development, and for solving global challenges such as financial crisis, environmental strain, diseases and poverty. Innovation is put forward as a main factor to enhance economic growth in industries, regions and nations (Lundvall, 1992; Malecki, 2002; Malerba, 2002; Verspagen, 2005), and is also suggested to be important at the firm level to recreate and maintain competitive advantage over time. The early scholarly work on innovation includes the influential analysis of Schumpeter (1934), who looked at major innovations as driving economic development. Building on his work, innovation is still often defined as new combinations of production factors in the form of production of new goods or services, introduction of new production processes, the opening of new markets to new sources of raw materials and intermediates, and re-organization of an industry. Contemporary research on innovation is broad in scope and perspectives, including innovation processes within firms, as well as in local, regional or national innovation systems of firms, institutions and governmental bodies (Fagerberg, 2005). Recently, there has been a growing interest in social innovations and innovations taking place in the public sector.

The gender issues of innovation are seldom discussed. One main reason for this deficit is that innovation research seems to lack analyses of where innovation takes place and, particularly, of who participates in innovation (Fagerberg et al., 2005). There seems to be an under-communication of the role of the innovator in innovation literature (Brännback et al., 2012). The lack of focus on individuals as actors tends to make gender invisible (Alsos et al., 2013). However, there are of course individuals within the processes, the organizations and the systems frequently discussed in innovation literature – the question is rather to illuminate the impact of gender by including it in the analyses (Thorslund and Göransson, 2006).

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While the literature is still scarce, the issue of gender and innovation has been put on the agenda in the last decade (e.g. Abrahamsson, 2002; Alsos et al., 2013; Blake and Hanson, 2005; Doss and Morris, 2001), and gender and innovation is emerging as an issue for scientific research. Published research suggests on one hand that gender diversity is positive for innovation (e.g. Østergaard et al., 2011) and on the other hand that gendered understandings of innovation lead policy makers – and scholars – to overlook women’s involvement in innovation (e.g. Blake and Hanson, 2005; Kvidal and Ljunggren, 2013). This paradox, among others, exemplifies the need for more scholarly work to better understand the role of gender in innovation.

This book addresses these knowledge gaps in several ways. It takes a broad perspective to gender and innovation. The chapters include discussions on innovation in women-owned businesses, larger corporations, public organizations, policy and design. There is a large variety in empirical contexts, with respect both to country contexts and to industry and organizational contexts. The chapters, most of them containing empirical analyses, use a wide range of methodological approaches including action research, discourse analyses, case studies and quantitative analyses of register data. At the general level, the chapters in various ways show that women are indeed involved in innovation, in numerous ways and in many different contexts. However, the dominant idea about innovation seems to be extremely gendered, and women often do not fit the ideas about innovation in one way or another. They may carry out their innovation activity in industries not considered to be the main areas for innovation, or in geographical or social contexts where innovation is seldom looked for. Nevertheless, even when women involve themselves in ‘mainstream’ innovation related to technology and manufacturing, they still seem to be defined as different and ‘the other’. This image is also found in innovation policy, according to analyses reported in this volume. Women’s innovation is portrayed as something different, challenging the ideas about what innovation is. Thus this volume documents the masculine connotations associated with innovation in many layers.

We have chosen to start with acknowledging and analysing the scarce, but evolving, literature on gender and innovation. In Chapter 2 of this volume, Lene Foss and Colette Henry review this emerging literature. They develop a framework to analyse how gender is conceptualized in the literature, how innovation is defined and, hence, the connections made between gender and innovation. They find that few articles actually discuss the relationship between gender and innovation. Nor do publications generally discuss the perspective taken to gender. Foss and Henry compare the status of the literature on gender and innovation to the

development of the gender and entrepreneurship literature, which so far is more advanced. They conclude that innovation research is lagging behind in its inclusion of a gender perspective, and suggest that the innovation literature would benefit from increasing the number of studies of gender and, specifically, adopting a more feminist epistemology.

Following this literature analysis, which completes Part I, the book is divided into four further parts. Part II deals with gender and innovation in the context of new and small businesses. This is followed by Part III on gender and innovation in large and established firms. From there, the gender aspects of innovation policy are discussed in Part IV, before Part V analyses gender in materiality and design related to innovation.

In the next section of this chapter, each of these parts is presented. The chapter then ends with a reflection on the way forward, focusing on the role of men and masculinities in innovation.

## GENDER AND INNOVATION IN NEW AND SMALL BUSINESSES

Part II of the book comprises four chapters each dealing with gender and innovation in new and small businesses, and growth businesses. The chapters provide a link between innovation and entrepreneurship following the Schumpeterian understanding, i.e. understanding entrepreneurs as innovative actors. The chapters in this part also show how innovation takes place in different geographical and cultural contexts: three countries in East Africa – Kenya, Tanzania and Uganda; three countries in Latin America – Brazil, Bolivia and Colombia; and two European countries – Germany and Portugal. In spite of the different geographical and cultural contexts, the barriers facing innovative women are surprisingly similar throughout the different countries. It seems to be common for the innovation and entrepreneurial activities carried out by women not to be perceived as ‘real’ innovations or business activities. The chapters draw our attention to everyday innovations, innovation within nursing entrepreneurship, and the particular hurdles and invisibility women innovators face in the different contexts.

In Chapter 3, Teita Bijedić, Siegrun Brink, Kerstin Ettl, Silke Kriwoluzky and Friederike Welter make use of existing data in Germany regarding gender and innovation. They show how women’s entrepreneurship does not fit the dominant ideas on innovation as technological and product based. Women are less likely to carry out technologically based product and process innovations compared to men. The authors propose several conceptual explanations for these findings:

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that aspects of the institutional frameworks such as taxes and family policies impact individual preferences on educational and professional choices; that context factors foster and perpetuate traditional norms, and that women and men face different role expectations. The authors conclude that women are not less innovative but that a combination of institutional constraints and traditional role models contributes to self-selection into female-typed professions and working structures such as part-time work.

In Chapter 4, Ruta Aidis introduces three successful Latin American women entrepreneurs, from Brazil, Bolivia and Colombia. They have succeeded by being innovative in three quite different industries: industrial services and recycling; personal services; and manufacturing. The data consist of interviews and secondary data, and the author has applied an institutional framework for the analysis. Setting out the facts about women and entrepreneurship in Latin America, based on GEM data, she shows that Latin American women entrepreneurs score at a medium level in innovativeness compared to US and Asian women entrepreneurs. Based on the three cases, Aidis explores the institutional impediments innovative women face: gendered attitudes, access to finance, access to support and networks, access to global markets, and bureaucratic barriers. She claims that successful women entrepreneurs can serve as catalysts for institutional reforms. International recognition gives these women visibility, credibility and access to resources in their domestic countries.

Malin Tillmar argues in Chapter 5 that mainstream perspectives on innovation are not only gender biased, in several dimensions, but also context biased and ethnocentric. Her chapter reports from qualitative studies on innovations occurring in the mundane everyday life of urban female SME owners in the three large countries in East Africa: Kenya, Tanzania and Uganda. The cases illustrate the innovativeness that is exercised, even required, by these women simply to sustain the livelihood of themselves and their families. The phenomenon of innovation is gaining more ground in the literature, and research is expanding the mainstream definition of innovation to include, for example, the everyday innovativeness of women in emerging economies, such as in East Africa. Yet this broader perspective of innovation has not received adequate attention.

In Chapter 6, Selma Martins, Emília Fernandes and Regina Leite analyse how gendered discourses are applied to define innovation in a 'feminine' context: nursing. Following the economic crisis, Portugal has faced an increased number of entrepreneurial endeavours in the nursing care sector. Using personal interviews with 18 nursing entrepreneurs, the authors aim to explore how innovation is constructed in this 'new' sector,

which is hallmarked by a gender paradox. The two professional practices are constituted by different gender meanings: nursing is considered to have a feminine nature and is almost exclusively a female-dominated occupation; entrepreneurship is considered a masculine practice and is traditionally associated with men. In their analyses, the authors extend the understanding of innovation within entrepreneurship to inscribe feminine concepts such as ‘caring’ and ‘nurturing’. Further, they discuss whether this construction of innovation implies a hindrance or an opportunity to gender equality and the emancipation of women.

## GENDER AND INNOVATION IN AN ORGANIZATIONAL CONTEXT

Part III consists of three chapters, all addressing innovation in different organizational settings conceptually or empirically, ranging from public sector health care to mining and forestry. Organizational innovation is a well-studied innovation type. Crossan and Apaydin (2010, pp. 1155–1156) suggest that it consists of three components: ‘innovation leadership, innovation as process and innovation as an outcome’. However, as found by Alsos et al. (2013), organizational innovation is a research field with a limited understanding of gender and, if studied, it is often with sex as a variable or control variable. The diversity management literature is sometimes applied as a theoretical point of departure when studying organizational innovation, and we have one example of this among the chapters in Part III. Interestingly the chapters in this part cover both public sector and private firms. The chapters also address innovation as a process and as an outcome, but none focuses on innovation leadership. It is particularly interesting that the two chapters studying processes and outcomes find that persisting norms in the organizations need to be changed and that such changes could be understood as innovations per se.

Shruti R. Sardeshmukh and Ronda M. Smith in their conceptual chapter, Chapter 7, discuss that, even if women form almost half of the workforce, women do not seem to be innovative. By applying diversity management literature from the organizational studies and innovation literature they identify structural and social hurdles in two phases of the innovation process: idea generation and idea implementation. When discussing the idea generation phase of innovation, they suggest applying social role theory in order to identify different gender role expectations, to focus on capabilities to highlight developmental opportunities at workplaces and finally to use motivation theories to investigate factors

reducing women's motivation for innovation. In the idea implementation phase they suggest applying the theoretical approaches of the role of the social network, social capital and champions. The authors argue that, while idea generation is dependent on individuals and their characteristics, idea implementation relies more on group and organizational characteristics. They claim that female employees are an untapped resource in organizations' innovation work and suggest that organizations should relate to identity-conscious practices to discover innovative ideas. They suggest that the diversity management practices developed within the human resource policies could be useful for organizations' innovation processes, and a diversity management perspective could contribute to the innovation literature.

Nina Amble and the two nurses Paula Axelsen and Liv Karen Snerthammer look at innovation in the care sector in Norway, and in Chapter 8 present new ways of organizing work hours. The innovation consists of both a new rota system and changing the perceived norm of care work as part-time employment to one of full-time employment. They have carried out action research, and the action research process in two health care institutions is described. The process was employee driven and was introduced as a possibility to better organize work, i.e. to get more done with less energy and struggle. They apply Kanter's (2000) definition of innovation as 'the development and exploitation of new ideas' and an understanding of welfare innovation as 'new and familiar knowledge brought into use in new context' (Kristensen, 2008). The new rota system is described as an organizational innovation in the public sector: introducing longer shifts and a new resource team for the nurses. The new system improved care quality and the working arrangements at the workplace. In addition, the authors show how the innovation concept in itself enabled changes and also filled the work shift schedules with new content. The authors apply a gender perspective in their analyses.

Malin Lindberg, Eira Andersson, Lisa Andersson and Maria Johansson in Chapter 9 study organizational innovation and investigate whether gender equality measures in two Swedish firms in highly masculine industries, mining and forestry, can be perceived as organizational innovations. Their theoretical point of departure is the concept of newness, which is central to the innovation literature. They also apply Lam's (2005) classification of organizational innovation into three streams. These are applied in the data analyses, along with a gender perspective. The authors have conducted case studies in one large mining and one large forestry company in Sweden that both have worked with gender equality measures. The authors analyse whether the gender equality measures carried out in the two companies can be understood as

organizational innovations, applying two different classifications based on newness: traditional and innovative. They find that three of the measures can be perceived as innovative and contributing to structural changes in the gendered patterns in the firms. These are: 1) creative workshops; 2) cooperation with gender researchers; and 3) engaging in work to challenge masculinities.

## GENDER IN INNOVATION POLICY

Part IV comprises two chapters dealing with gender in innovation policy. Innovation policies are important vehicles at the societal level in determining how we understand innovation, what activities are deemed desirable and what kinds of actors are seen to contribute favourably towards innovations. Thus the innovation policies can be interpreted from the perspectives of inclusion and exclusion: what kind of individuals, activities, organizations and sectors are included in innovations and what is then left out and excluded from them. Both chapters in this part discuss inclusiveness of innovation policies from different angles. First, they examine existing innovation policies to understand the extent to which they are inclusive and allow questioning of the dominant understanding of innovation. Second, they suggest that a refocus of innovation on gendered social innovations opens up the path to new policy making and generating new innovation policies that are more inclusive.

In Chapter 10, Trine Kvidal-Røvik and Birgitte Ljunggren examine gender and innovation articulations in a policy programme in Norway using discourse analysis. They suggest that through this policy women are constituted as different, and it is by this difference that they are legitimized as participants in innovation. Gender is seen as relevant in so far as it represents a resource for innovation. Since innovation is understood to benefit from variety in terms of knowledge, gender balance is framed as something that will contribute to this broad range of knowledge and people. Gender is governed in the policy programme towards a rather narrow and limited space of innovative action for women. Both innovation and gender, and the ways they are articulated in the policy programme, are marked by an advanced liberal governmentality making social subjects relevant only as resources to strengthen some kind of totality.

In Chapter 11, Malin Lindberg and Knut-Erland Berglund first discuss the concepts of social innovation and gendered innovation in order to identify if those debates could enrich each other and contribute towards gender-inclusive innovation policy, research and practice. The chapter

suggests that both social innovation and gendered innovation aim at challenging the existing ideas of what innovation is. Both discourses suggest broadening innovation as a theoretical concept and thereby democratizing innovation. From the policy perspective, this focus on gendered social innovations invites a new, more inclusive range of actors, industries, sectors and consequently innovations at the heart of innovation policy.

## GENDER IN DESIGN AND MATERIALITY

Part V, the final part, discusses innovation understood in the classical sense: as new physical products developed by engineers based on research and technical knowledge. Anchored in post-structural feminist theories on 'doing gender' (West and Zimmerman, 1987), both chapters in this part present original and novel analyses of how inventions, innovations and innovation processes are gendered.

In Chapter 12, Seppo Poutanen and Anne Kovalainen take Kanter's (1977) theory of tokenism as their starting point for analysing the evolution process of a female innovator in a chemistry processing plant, where she was the only female engineer. The tokenism perspective allows them to analyse the situation where she represents the numerical minority of one and stands out as different from the others within the organization, as a 'token'. Using a narrative analysis, they effectively illuminate the gendered processes of invention and innovation, and relate this to questions of the visibility, legitimacy and acceptance of an innovator within a large industrial corporation. As a research manager in the R&D department of the corporation, the female chemistry engineer experienced being treated as invisible and looked down upon based on her gender. She made herself visible through taking action and delivering successful innovation, gaining legitimacy through defending her achievements and her management position against the efforts of her male colleagues to hold her back.

In Chapter 13, Emma Börjesson, Anna Isaksson, Sara Ilstedt and Karin Ehrnberger show how norm-critical design can be used to put the gendering of innovation on the agenda and to disclose the built-in but hidden gendered aspects. Following an action-oriented approach, they analyse the invention and testing of a male version of the gynaecological chair, the so-called Androchair, introduced as equipment for better prostate examination, to highlight how innovation is gendered. This is a very efficient way to disclose how the gynaecological examination chair



has been normalized and become unchallenged as something that necessarily has to be a certain way despite its making women undertaking gynaecological examination more vulnerable and uncomfortable than necessary. In their study, Börjesson et al. problematize needs based on a gender perspective and, in a novel way, illuminate the importance of a gender perspective to innovation.

Leaning on action network theory, which holds that not only human beings but also physical objects can be studied as active social actors, and as physical manifestations of social relations (Latour, 2003), Poutanen and Kovalainen and Börjesson et al. address the role of materiality for the understanding of how innovation is gendered. They show how innovations, as physical artefacts, can be permeated with gender themselves, distinct from (but also related to) the gendered processes through which they are created. In Chapter 12, the authors describe how titanium dioxide is changed from a masculine artefact used in the production of painting and coating to a feminine artefact used for cosmetic production, not only by the refinement of the product itself but also by changing its packaging. In Chapter 13, the authors consider how the design of the gynaecological chair as a feminine artefact is used to design an examination chair for men, effectively disclosing how the equipment itself has functions that are gendered. Hence, in these two chapters we get an insight into how the design and materiality of innovation are embedded with gender.

## REFLECTION: MEN AND MASCULINITIES' PERSPECTIVE TO INNOVATION

Gender and innovation is an emerging field of research (Alsos et al., 2013), but as can be seen through the chapters in this Research Handbook it has quickly gained a strong and significant foothold. Importantly, the chapters highlight that gender is not about women but about gendered processes and structures (Alsos et al., 2013) that contribute to our understandings of innovation and innovation agents. This gendering view has been advocated also in this volume, and many important insights are put forward. However, most analyses focus on the experiences of women or in the ways gendering processes affect women. For example, the authors discuss how the invisibility of innovations in the public sector affects women, who – at least in the Nordic countries – form the main part of the workforce in the public sector (Amble et al., this volume, Chapter 8), or the ways innovation policies craft a role for

women as providers of different resources (Kvidal-Røvik and Ljunggren, this volume, Chapter 10).

The risk with theorizing solely about women and their experiences is that it reinforces the dominant image of men as the unmarked sex, where men and masculinities need not be questioned (Oudshoorn, 2004). Men and masculinities are central to organizational analysis but too often not centred in the investigations. Future research should make men and masculinities explicit objects of theorizing and problematize masculinities (Collinson and Hearn, 1994; Hearn, 2004) in the field of innovation. This problematization also includes being careful when notions of femininity and masculinity are attached to women and men in order to avoid gender essentialism (Poutanen and Kovalainen, 2013; Remneland-Wikhamn and Knights, 2013). Thus our call to focus on men and masculinities in future research on gender and innovation does not aim to suggest an amalgamation of the two but rather invites nuanced analyses of how men experience innovation activities and what kind of masculinities innovation work invokes, for example. Next, we will discuss some perspectives that in our view merit further attention with this particular suggested focus.

Research on gender and innovation suggests that the male-dominated industries are understood as sites for innovation with the automatic association of technology and innovation (Wajcman, 2010). However, to our knowledge there are relatively few studies conducted that investigate what the implications are for men working in these industries. It is possible to develop three trajectories: 1) positive; 2) negative; and 3) mixed effects (Holter, 2014). First, in the positive view, one may advocate that the focus on innovations and being involved in innovations offers intrinsic rewards and improved job satisfaction for the male innovators. For example, Mellström (2004) demonstrates how Swedish male engineers and Malaysian male motorbike repair shop workers, i.e. men who work closely with machines, feel passionately about them: 'machines are culturally defined as an object of men's passion because men have an embodied relationship with the machine and because the machine is often a symbiotic extension of the person, of the man' (Mellström, 2004, p. 379). Thus, it would be interesting to further study how both men and women experience their innovative work and what kind of gendered relationships they develop towards the innovations they are involved in developing. In addition, studies in management and entrepreneurship have highlighted the embeddedness of masculine values in organizations, for example in terms of measures of success (Ahl, 2006; Collinson and Hearn, 1994). Therefore, it might be interesting to develop more insight into how the men working with innovations deal with

failures, and the ways these failures are constructed in the context of masculinities. Homosociality – i.e. the preference of men for working with other men – has been highlighted in previous research (Holgersson, 2013). Within organizations, innovation work is often done in teams, and hence the ways homosociality is performed and the practices involved within these innovation teams would be an interesting research avenue.

Second, the negative effects view may suggest that with the pressure to be innovative and produce innovations comes also stress or other health problems, or those not succumbing to the innovation pressures will have to leave the organization or the industry. Since paid work continues to represent the heart of men's life project, and determine the identity of men (Català et al., 2012; Collinson and Hearn, 1994), the ramifications of the marginalization or exclusion of non-innovative men or men who fail in their innovative activities in the innovative industries or companies may also be important. Therefore, studies of the innovation cultures within organizations and in other contexts and studies of how they affect individuals – men or women – and including those who feel excluded from those cultures are needed (Sinclair, 2000). For example, it might be interesting to address what kind of masculinities are available for the men who are not involved in innovation work or fail in their innovative work. Collinson and Hearn (1994) suggest masculine identities are precarious and fragile, and have to be constantly constructed and renegotiated, and that various events, changes and processes may threaten these identities, including the attempts to secure and hold on to the certain clearly defined and coherent identities. For example, Remneland-Wikhamn and Knights (2013) investigate to what extent the open innovation framework challenges masculine discourses of innovation within the automotive industry. They conclude that the industry has not been able to open up to the radical insights offered by open innovation initiatives. Consequently, the masculine discourses are reproduced rather than challenged by open innovation.

When investigating the potential implications of innovations and innovative work on men, it is necessary to ask the further question of 'Which men?', since the effects are likely to vary depending on social class, hierarchy and other divisions. Comeau and Kemp (2007) demonstrate discursively how work in the IT sector is constructed as an arena for sports or war, and these ties normalize the affiliation of youthfulness and technical ability, and consequently at the intersection of age and masculinity older workers were marginalized in small IT firms. Hence, the third mixed effects view suggests that the effects will be different for different groups of men (Holter, 2014) and also that men construct different masculinities in different contexts. For example, a study by

Filteau (2014) demonstrates how men working in the oilfield are able to construct a new dominant masculinity reflecting safety at work (also Lindberg et al., this volume, Chapter 9), while they remain complicit with the hegemonic masculinity in the domestic sphere. The study by O'Connor et al. (2015) suggests that new ways of doing masculinity are being practised within the university sector but still preserving male privileges. Thus, future research could more extensively investigate intersectionality and pay attention to the competing discourses that renew and reproduce masculinities in the context of innovation.

The visibility of men in innovations may also be exaggerated if not scrutinized. For example, Oudshoorn (2004) discusses the ways 'the weak alignment of contraceptive technologies and masculinities constitutes a major barrier for technological innovation in contraceptives for men' (p. 353). Therefore, the story is not so much about developing the technology but of renegotiating masculine identities. This suggests a need for creating the cultural feasibility of technology by articulating the gender identities of users. Börjesson et al. (this volume, Chapter 13) and Oudshoorn (2004) suggest that, while men are generally seen as important and highly visible agents when it comes to innovation, as users of particular health care innovations they remain invisible.

Future research could pay more attention to men and women as (potential) users of innovations and how their gender identities are constructed in the context of different innovations. For example, even if women have traditionally held the main responsibility for domestic chores such as cleaning and taking care of the laundry, what kind of new gendered identities are different family members constructing as the users of the newest high-tech and intellectual models of washing machines capable of diagnosing the laundry and auto-selecting the washing process accordingly? When high technology is pervading our social lives, are we able to witness new demarcations of women's and men's work, be it in organizations or in homes?

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