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Marina Della Giusta and Sophie Clot and Giovanni Razzu

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Special Issue Women Entrepreneurship in the Digital Age

The behavioural foundations of female entrepreneurship: what can experiments teach us?

Sophie Clot, Marina Della Giusta and Giovanni Razzu

University of Reading

Abstract

We bridge the women entrepreneurship literature with the experimental economics literature on gender, with the aim to contribute a different perspective on the barriers and opportunities for women entrepreneurs, and one that we hope can help both fields by questioning some of the implicit assumptions that are often made (and used in policy) about the reasons for the differences observed between male and female headed businesses. In the course of the discussion we also revisit the definition of entrepreneur and the role of risk aversion in both neoclassical theory and in the identity perspective and draw implications in the context of the digital age and its potential to level the playing field between women and men in business venture.

1. Introduction

Our contribution aims to revisit the results of experimental and field studies of gender differences in attitudes connected to entrepreneurship with the dual aims of linking the evidence base provided in experimental studies with female entrepreneurship discussions (Greene and Brush, 2018; Orser and Elliott, 2015; Huges et al, 2012), and to use our specific lens of labour and behavioural economists with experience of studying gender in many forms of work (formal and informal, paid and unpaid) in order to situate women entrepreneurship within the discussions surrounding barriers and opportunities for women in the workplace more generally. Since the time when one of us contributed to the Oxford Handbook of Entrepreneurship (Casson et al., 2006), the literature on women entrepreneurship has bloomed (for recent reviews see Poggesi et al 2016; Yadav and Unni, 2016) and addressed a specific set of issues in relation to the adoption of an explicitly feminist perspective (Henry et al., 2016) interrogating both the assumptions of what entrepreneurship is (traditionally defined and studied as essentially male, thus establishing gender differences essentially in terms of limitations and shortcomings) and the methods adopted for studying entrepreneurship (from the areas of activity considered to the approaches adopted to define and investigate success and failure). Indeed, as articulated by Ahl (2006), some accepted research practices in women's

entrepreneurship simply serve to recreate subordination, thus restricting the field's development. For instance the individualist focus has not only meant that "contextual and historical variables ... such as legislation, culture, or politics are seldom discussed" (2006: 605) and by eschewing gendered power structures and concentrating on mean differences between female and male entrepreneurs has led to a narrative of 'shortcomings' of female entrepreneurs that are attributed to women and ascribed to innate differences, suggesting that the onus is on women to change (e.g. through education, networking skills, etc.) in order to improve their entrepreneurial success. Alongside, a literature on feminine capital has also emerged, providing both further evidence on the booming phenomenon of women enterprises and identifying the specific ways in which being female influences entrepreneurship (Orser and Elliott, 2015, p.19). Closer to home for us, the economic literature on women in all forms of work has literally exploded over the past few years, so we will not aim to provide an overview of women and work, but rather provide a framework for discussing female entrepreneurship as a particular form of work, which will require discussing it in the context of various wider gender gaps as well as engaging with both the literature that ascribes them to the gender norms that govern the environment in which women and men work, and that which engages with their different responses to said environment (all the while remaining conscious of the artificial and outdated separation between nature and nurture that much of the literature currently proposes in the social sciences).

We will begin our discussion by briefly sketching some recent evidence on women's work, and then present issues emerging from the most recent reports on gender and entrepreneurship. We will discuss various factors and then focus on attitudes and present the most recent experimental evidence on gender differences in attitudes, their relative importance in explaining a variety of outcomes in education and labour markets and use this evidence to critically assess the specifically gendered constraints and opportunities that women enterprises face. We will draw upon a wide body of literature as well as our own work, which we hope will make it possible to identify both areas where further research (especially field research) is needed to challenge some widely held assumptions and gender stereotypes which are sadly reflected in both education and the world of finance (which determine some of the most crucial resources entrepreneurs need). We will conclude highlighting specific characteristics of the digital age that have made it possible to overcome some of the specific obstacles faced by women entrepreneurs and generate innovations that are making their enterprises more successful.

In the course of our discussion we will question some tenets of both the entrepreneurship and the behavioural economics literature. For example, the notion of risk taking as intrinsic to entrepreneurial success which has led to identifying mean differences in risk aversion between women and men as explanations for differential entrepreneurial attitudes, fields of operation and success. Yet, this is not what other well accepted definitions of entrepreneurship propose: Casson (1982) for example suggests that what distinguishes an entrepreneur is their ability to take *judgemental decisions about the coordination of scarce resources*. These are decisions for which no obviously correct procedure exists, reflecting both the costliness of factual information and the partial and limited nature of the conceptual frameworks used to interpret this information when arriving at a decision (Casson, 2010). Judgement is particularly important in improving the quality of decisions that must be taken *urgently* in *novel* and *complex* situations where objectives are *ambiguous*. The urgency of decisions is often stimulated by *competitive forces*; in particular, by the need to recognise and exploit profit opportunities before others do. The emphasis in the definition on *scarce resources* confines attention to decisions of an economic kind – such as business decisions. Reference to the *coordination* rather than the allocation of resources emphasises the dynamic aspect: *coordination changes* the allocation in order to improve the situation (Casson, 2010, p. 253). He further suggests that conflating entrepreneurship with business ownership is misleading: some self-employment has no entrepreneurial characteristics to speak of, while some roles within business organisations instead do, a point to which we will return later. Risk aversion does not come at all into Casson’s definition. Indeed, according to Gifford (2010) risk aversion is a result of entrepreneur’s behaviour in the process of making decisions under limited attention rather than a feature of the entrepreneur. In her framework, changes in the environment that decrease the opportunity cost of attention (or in the information endowments of entrepreneurs vis a vis others through their knowledge and networks) will thus generate behaviour that appears the product of lower risk aversion.

This is important in the context of experimental studies of gender differences in risk aversion that are routinely used to ‘explain’ a variety of gender gaps, and that in the context of a recent meta review by Nelson (2015) have been shown to consist in small differences in means and not in distributions (and often disappear altogether outside the lab), thus appearing as a classic case of biased beliefs based on the use of representativeness heuristics (Kahnemann and Tversky, 1983) which lead to exaggerating small differences in some parts of the distribution of attributes of one group relative to another. This type of stereotyping (including self-

stereotyping) can be self-reinforcing and quite damaging as discussed by Oxoby (2014), who shows how the process of forming beliefs about one's own ability incorporating irrelevant information on observable types can bias downward one's perception of one's own ability (or upward if the type-based biases are positive), and lead to inefficient allocations of agents across more and less skilled sectors in the labour market and a growing segregation over time through the feedback to agents from increased type-based biases in their beliefs. A large part of the feminine capital agenda (and indeed core to Lean-In type movements) is heavily invested in overcoming just such biased perceptions. Moreover, one interesting facet of the digital age is that it makes indeed possible to both overcome many of the barriers that women entrepreneurs have faced historically and make them more visible thus creating more positive role models and bringing about change.

2. Gender gaps in work, leadership and entrepreneurship

A long term view on the labour market in many countries and, particularly, in the most advanced ones, reveals that gender gaps in key outcomes such as participation, employment and pay have narrowed substantially (OECD, 2017; Razzu, 2014). This is not a uniform or linear process, however, and there are strong indications that the rate of progress has slowed down considerably since the early 1990s, perhaps indicating that major gains may have been exhausted. The long-term changes in gender equality in key labour market outcomes can be considered to have been positive. Overall, these have been the reflection of key socio-economic trends over the last part of the twentieth century, which have contributed to shape the labour market position of men and women. These include demographic changes, particularly changes in life expectancy and the ageing of the population, which have directly impacted on the size of the working age population; trends in fertility rates and changes to the methods of contraception; the creation and development of the welfare state and the associated structural changes to the labour market, in the form of the growth of "white-collar" and service jobs in education, health and the service sectors more widely for instance, accompanied by the greater educational attainment of young women compared to young men; finally, changes in attitudes towards women and employment and the stereotypes and expectations around gender roles (Goldin, 2014; Razzu, 2014). These changes would also need to be considered alongside the development of legislation aimed at prohibiting sex discrimination and promoting equal treatment of men and women in the labour market and also the range of public policies that, in many countries, have allowed for improvement in combining work with child rearing.

However, it is worth noting that the closing of gender gaps, particularly those in employment and participation, have been a consequence of declining employment and participation rates for men as well as increasing rates for women. Most importantly, gender gaps still persist and, as mentioned above, there is indication that, in some advanced countries, the rate of progress has slowed down since the early 1990s and, even more recently increased, as is the case for the employment gap in Ireland, Iceland, Spain and Estonia. Furthermore, in the wake of the Great Recession and ensuing austerity, evidence suggests that women have lost ground in many areas (for Europe see Rubery, 2015). It is also important to note that the situation is more heterogeneous than the one that appears from a general overview: differences persist in gender gaps across countries (Olivetti and Petrongolo, 2016). For instance, gender gaps in employment remain relatively smaller in Nordic countries and larger in other OECD countries in different continents of the world. Heterogeneity is also a characteristic of Eastern European countries that have transitioned to market economies during the past 25 years, even after having shared a quite common approach to gender employment during the communist past (Razzu, 2017). In what follows we briefly revisit the evidence on the persisting gaps, outlining the major labour market challenges and barriers women face to ensure further progress is achieved.

The quality of employment

The increased employment rates for women have been accompanied by persisting gender gaps in the quality of employment and occupations. It is well established that women face substantial challenges to working full-time, they work prevalently in so-called female dominated sectors and occupations resulting in labour market segmentation. Women also face specific challenges to advancing their career. In many countries, women are far more likely than men to work part time and while part-time working patterns are important in order to ensure labour market attachment and participation, it has a non-trivial negative impact on pay and career progress (Goldin and Katz, 2016). Women continue to be overrepresented in the service sectors and particularly in health, retail and social work. In terms of occupations, they are often restricted to work as sales people in shops, cleaners, primary school teachers, secretaries and care workers. The higher levels of occupational segmentation and the restrictions women face in the jobs they can choose result from a combination of factors, including the educational subject choices but also gender socialisation and a structured system of institutions and norms in which gender play an important part.

Career progression

The career of women is also much shorter than that of men, on average one-third shorter. The higher likelihood to involve part-time work, career interruption due to child birth but also discriminatory practices are all contributing factors. Indeed, it is striking that in many countries, gender gaps in labour market outcomes are minimal for childless women and men; these gaps start to develop and increase substantially once women become mothers. Childbirth indeed represent a crucial trigger point in women's career, the withdrawal from the labour market that is associated with the birth of a child having long term effects in terms of employment and pay. The variation across countries in the long-term effects of motherhood are a consequence of the differences that exists in parental leave policies and childcare support more generally across countries. The unequal distribution of unpaid work represents an important barrier to women's progress in the labour market. Women's share of unpaid household and care work is still much larger than that of men across all countries. This not only results in a substantial gender gap in total time of paid and unpaid work but also restricts the time women can spend in paid work.

Leadership

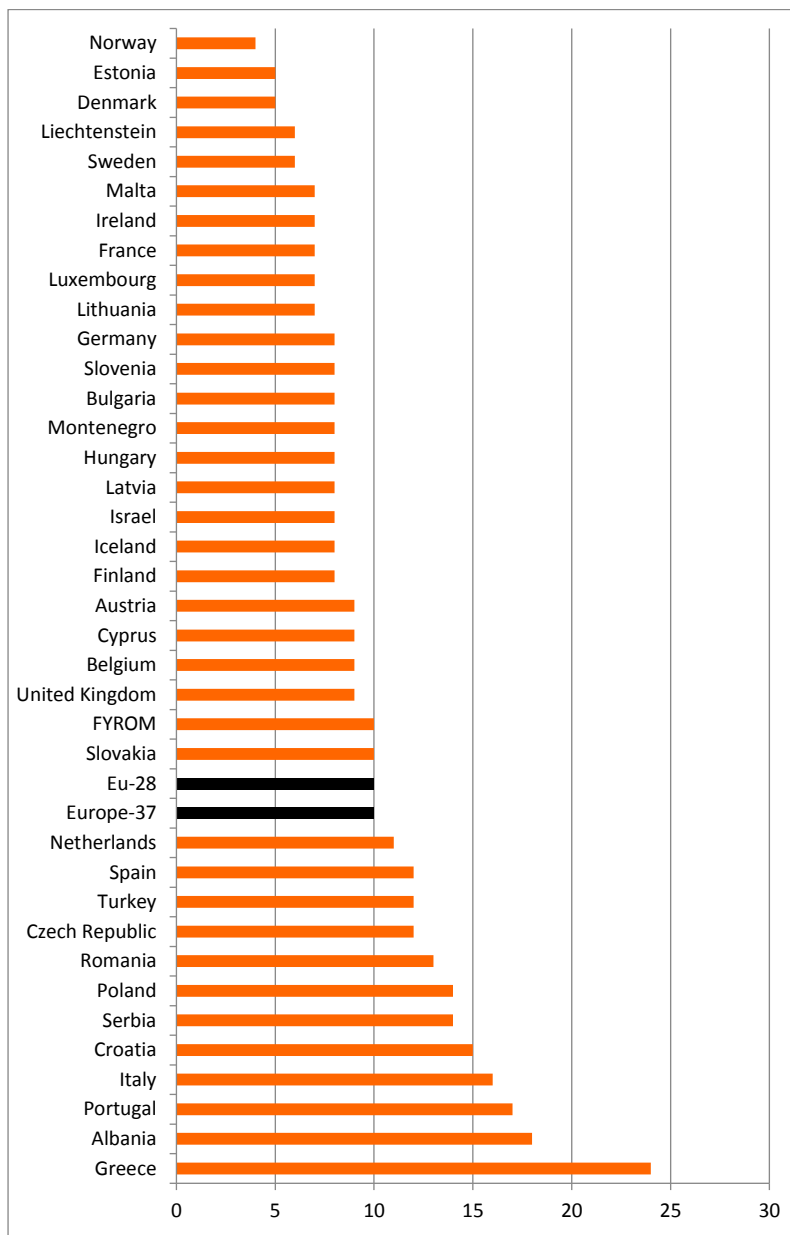
Women are much less likely to be CEOs and hold leadership positions in boards of both private and public sector companies (EIGE, 2018). The establishment of quotas have resulted in some substantial improvements in some countries, which has not been comparable to the much smaller improvement in countries that have instead adopted targets or voluntary approaches. A similarly dismal situation exists when looking at the gender balance in legislative bodies, women representing less than 29 percent of seats in lower houses of parliaments in 2016. Gender gaps persist in the civil service and government administrations, where women made up less than 33 percent of senior management positions in 29 OECD countries in 2016 (OECD, 2017).

Entrepreneurship

It is well established that gender is one of the factors associated with the rate of entrepreneurship (Brush, 2006). In their 2008 research making use of the Global Entrepreneurship Monitor data, Ardagna and Lusardi (2008) found that gender did indeed impact on both the probability of being an entrepreneur even when controlling for other personal characteristics, such as skills, fear of failure, social networks, age, and income. Women do therefore face a set of challenges to establishing and running a business that are often different from those faced by men, with access to finance, access to information, networks

for business purposes but also to social norms and social networks, legislation and the reconciliation of business work with family responsibilities (though this is not found in Norway by Raknerud and Rønsen, 2014) all contributing to different outcomes. Studies report there are 200million women entrepreneurs in the World. 2012 data show that of the around 40million entrepreneurs in Europe, more than 11.5million were women. This however masks the considerable differences that exist between countries. The Global Entrepreneurship Monitor (<https://www.gemconsortium.org>) provides a key source of evidence on female entrepreneurial activity. The 2017 GEM report finds that established business rates increased by 8% on average and the gender ratio improved by 9% in the 74 countries it surveys, and across economies when economic development increases, established business activity among women declines and the gender gap increases. However, while greater demand for entrepreneurship exists in developing than in developed economies, comparatively fewer enterprises transition to a mature stage. Conversely, innovation-driven economies exhibit less demand for entrepreneurship, but entrepreneurs who start are more likely to launch sustainable businesses. The gender gap in entrepreneurial activity has narrowed over the previous two years across most countries in the sample (74), with wide differences in rates across countries (from 3% in Germany, Jordan, Italy and France to 37% in Senegal) with a much higher likelihood for women of citing necessity as a motivation. Entrepreneurial intentions have also increased, and the gender gap is narrower suggesting difficulties arise in translating intention into successful action, again with differences across both countries and levels of economic development. Exit is also lower in innovation driven economies, although there are also fewer start-ups: discontinuance is highest in sub-Saharan Africa, followed by Latin America, the regions where the start-up rate is highest. The GEM report finds that the challenges include greater likelihood of necessity motivation (compared to opportunity) for women entrepreneurs, lower growth expectations, and higher rates of discontinuance than men. There are also paradoxes: as the level of economic development increases, the rate of entrepreneurial participation by women decreases. Similarly, women's perceptions of their capabilities of starting a business are inversely related to level of development: lower in innovation economies and higher in less developed economies, and the same trend is observed with education, confirming that there is not a simple relationship between development and female entrepreneurship. In Europe, the female entrepreneurship rate – the percentage of female entrepreneurs in the total active labour force – was relatively high in Greece, Albania, Portugal and Italy (24, 18, 17 and 16 percent respectively) and relatively low in the generally more gender equal Scandinavian countries of Norway, Denmark and Sweden (4, 5 and 6 percent respectively).

Figure 1: Female Entrepreneurship rate, Europe 2012



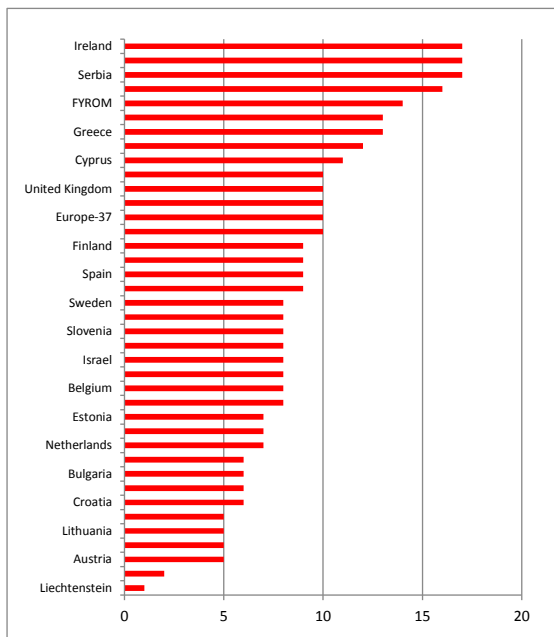
Source: EU Commission Report: Statistical Data on Women Entrepreneurs in Europe, 2014, based on Eurostat, UNICE, ILOSTAT and national statistics

However, is it the case that were women report relatively lower entrepreneurship rates, this is so also for men, an indication that the potential barriers women face to set up and develop their own business are not disproportionately higher than those faced by men? Figure 2 shows three interesting points:

- the considerable difference by country in the gender gaps in entrepreneurship rates;

- countries that reported high female rates also tend to report higher gender gaps on average;
- however, there are notable differences in that some with low female entrepreneurship rates (I.e. Ireland, Malta, France, Slovenia) have also considerable gender gaps in entrepreneurship rates.

Figure 2 Gender gaps in Entrepreneurships, Europe 2012



Source: EU Commission Report: Statistical Data on Women Entrepreneurs in Europe, 2014, based on Eurostat, UNICE, ILOSTAT and national statistics

A EU Commission study (EC, 2014) looked at a series of factors that could affect women entrepreneurship. It found that there was a strong positive relationship between the level of women unemployment and female entrepreneurship rate: countries with high levels of unemployment on average had higher levels of women entrepreneurs. Moreover, the unemployment rate also positively affected the percentage of necessity driven start-ups in the total start-ups.¹ Women entrepreneurs in countries with high unemployment rates were more likely to start a business out of necessity. There seems to be a weak negative relationship between the average level of GDP per capita and the level of women entrepreneurship and a

¹ Necessity driven entrepreneurs are entrepreneurs that are pushed into starting a business because they have no other options to work.

significant negative relationship between the level of trust in other people and the women entrepreneurship rate. An explanation could be that less trust in people could stimulate entrepreneurship that can result in more autonomy and control. Also, no significant relationship was found between barriers to obtaining finance and percentage of women entrepreneurs nor between the level of job autonomy and the women entrepreneurship rate. Similarly, no significant relationship was found between gender inequality (using the UNDP index) and the percentage of women entrepreneurs. This is important, and not just for women: Cuberes and Teigner (2016) have attempted to quantify the costs of these gender gaps in entrepreneurship and workforce participation across Europe, and suggested that gender gaps cause an average market output loss of 11.5% with wide variations across countries, dependent on the size of their gaps.

A recent study by Raguntashi et al. (2017) identifies fourteen barriers to women's entrepreneurship from the available literature, pointing that the majority of these were common across the globe and have been mentioned mostly in the literature. These are:

- Less interest in entrepreneurial activities
- Problems in acquiring financial resources
- Adoption of different strategic practices
- Slow growth
- Less monetary benefits
- High shut down rates
- Lack of institutional support
- Spatial mobility and lack of family support
- Lack of marketable skills
- Lack of social connectivity
- Lack of entrepreneurial management
- Absence of technological know how
- Lack of propensity to take risk
- Lack of education, experience and training opportunities

The authors adopt the DEMATEL approach to determine the causal relationship between the identified barrier finding that lack of education, experience and training opportunities, spatial mobility and lack of institutional support emerged as the biggest challenges to women's

entrepreneurship. Lack of education, experience and training opportunities among the women entrepreneurs was the strongest barrier among all. Lack of education and training limits the ability of women to take risk and grow and increases the dissolution rate due to lack of relevant skill and competencies. In addition, lack of awareness limits their participation in training programmes and support services provided by the government and the non-government institutions. Spatial mobility and lack of family support was found to be the second biggest challenge for women's entrepreneurship. This factor influenced their risk-taking ability and also contributed to high shutdown rate. The combination of business and household responsibilities challenges the success of a business. Restricted spatial mobility limits women from travelling to conduct or expand their businesses. Lack of financial resources emerged as another major barrier to women's entrepreneurship and led to fear of risk taking, less growth, less monetary benefits, high shutdown rate and lesser propensity to engage in entrepreneurial activities. None of these barriers are fixed, however, and there is a large literature documenting the effectiveness of interventions in support of women entrepreneurship (discussed in both Greene and Brush, 2018; and Orser and Elliott, 2015). A recent study using a randomised control trial by Bandiera et al. (2017), which tested the impact of providing young women with vocational training and information on sex, reproduction and marriage, found that, four years after the policy intervention, women who benefited from the programme were 48% more likely to engage in income generating activities, with 51% due to additional engagement in self-employment activities, compared to their counterparts in the controlled communities. The mechanisms through which programmes achieve the desired results are less clear and are interpreted differently depending on the assumptions made: on the one hand are those that assume women and men are the same think that overcoming external constraints is all that is required (i.e. levelling the playing field); on the other hand are those who think that prevailing gender norms and their internalisation through socialisation can in fact produce gender difference in attitudes and create 'confidence gaps' that have to be recognised and overcome (for a discussion see Greene and Brush, 2018 and Orser and Elliott, 2015).

Digital transformations

We have seen that non standard work, such as part-time, temporary and self-employment – the latter being one of the most commonly used measure of entrepreneurship activities - is not new and already accounts for around 30 per cent of jobs across OCED countries (OECD 2015 – *In it together. Why less inequality benefits all.* OECD Publishing, Paris: <http://dx.doi.org/10.1787/978926423510-en>). Digital developments, in the form of new

technologies and applications and digitally-mediated platforms, all appear to allow more freedom in where and when this kind of non-standard work is carried out. Indeed, women as well as men, can benefit from increased flexibility of where, when and how to work that is associated with the digital transformation, for instance the use of digitally-mediated platforms. It is the case, however, that most of the participants in the online economy are men, although there are cases where women are a majority, such as Etsy, a large scale platform for self-made goods, and Airbnb. In the UK, an estimated 70% of gig workers are male (Royal Society for the encouragement of Arts, Manufactures and Commerce. *Good gigs: a fairer future for the UK's gig economy*, RSA: <https://www.thersa.org/discover/publications-and-articles/reports/good-gigs-a-fairer-future-for-the-uks-gig-economy>). A survey of online entrepreneurs operating on Facebook found that women-run firms exceeded the percentage run by men in Australia, Canada, the Philippines, the United Kingdom and the United States. In contrast to business that operate offline, female entrepreneurs on Facebook reported, on average, the same confidences cores as men, and in Malaysia and the Philippines they tended to be significantly more optimistic.

Automation and its associated risks, particularly in terms of job losses, have been traditionally associated with manufacturing, which is a male dominated sector. However, evidence is emerging that the gender impact of automation is less clear cut: of the estimated 9 percent of jobs that are at high risk of automation (meaning that more than 70 percent of tasks in those jobs could be automated), there are also some large sectors where women's employment is substantial: food and beverage services activities and retail trade. Indeed, the average risk of automation is similar for men and women (OECD 2016, *Automation and independent work in the digital economy*. OECD Policy Brief on the future of work, May 2016).

The final gender outcome of digitalisation depends on the interaction between the transformation of work arising from digitalisation and the development of the job polarisation associated with low and high skills. Indeed, most of the growth in the past two decades has been of high skilled jobs, while medium skilled jobs have declined. Considered alongside the increased accumulation of human capital by women over the last decades, this polarisation of skilled jobs has benefited women more than men. It is also the case, though, which more women now also work in low-skilled jobs, and these have grown in relative terms. There is evidence that gender skill gaps persist in STEM related subjects but not in ICT skills, management and communication skills, self-organisation skills, and readiness to learn, suggesting that some of the structural barriers to entrepreneurship we have seen in previous sections are being shifted by the digitalisation of the economy. They may also change gender

differences in perceptions of entrepreneurial opportunities, particularly as the digital entrepreneurial ecosystem has characteristics that likely appeal to female entrepreneurs traditionally more represented in services, such as a service-dominant logic, value co-creation between users and entrepreneurs and the combination of cognitive and affective reasons for participating in production (Sussan and Acs, 2017). These also appeal to social values, which women cite more often than men do as an important barrier to participating in some sectors. Evidence from Kickstarter suggests that 44 percent of women use crowdfunding (Marom et al. 2016), they do not have lower funding goals and they also have higher rates of success than men, though they operate in different sectors, and importantly there is evidence that funders display taste-based discrimination. Srivastava et al. (2018) with different methods analyse 197 Kickstarter projects and find that women entrepreneurs' entrepreneurial self-efficacy, entrepreneurial passion and prior experience are associated with their projects' crowdfunding performance, suggesting that digital platforms may indeed help realise female entrepreneurial potential in ways that are new and effective (although clearly evidence of discrimination remains). Large supporting social networks for women entrepreneurs have taken off in recent years too and are contributing to enhancing the visibility of positive role models as well as making resources more accessible. As this visibility is enhanced it is hoped that both cultural stereotyping and gender norms pertaining to entrepreneurship will also be challenged and more financial backing will be made available for their ventures, including by emerging women venture capitalists which have traditionally been understudied and underestimated by the rather backward-looking culture prevailing in many parts of the financial community (as discussed in the 2009 report 'Women want more' of the BCG <https://www.bcg.com/documents/file31680.pdf>). In the following section, we focus more closely on gender stereotyping and attitudes and examine the contribution that experimental economics can offer to a fuller understanding of female entrepreneurship. We review the existing literature as well as present the result of our own field study of women consultants in the UK, and illustrate what lessons can be learnt from experimental studies in relation to gender barriers.

3. The role of attitudes: contributions from the behavioural literature

Entrepreneurial success is often defined in terms of 'need for achievement', 'propensity to take risks' and 'locus of control', but a focus on aspirations (what women want to achieve), behaviours (how they create and grow businesses) and confidence are actually all related to

identity (why, trust in themselves and degree of self-assurance), which is undertheorized in entrepreneurship, focussed squarely on studying men (Greene and Brush, 2018). One issue that the identity perspective is attempting to overcome is the idea of the construction of the feminine identity as antithetic to business, such that women must somehow either ditch their ambition or their femininity when trying to fulfil it (Bohnet, 2016; Orser and Elliot, 2015). The literature on gender norms suggests that women on average are expected to be conscientious and compliant (Carter, 2014; Eswaran, 2014) and the evidence on the distribution of personality traits suggest that on responses to the Big Five Inventory, women report on average higher levels of neuroticism, extraversion, agreeableness, and conscientiousness than men across most nations (Schmit et al., 2008; Costa et al., 2001). There is of course a social desirability bias at play (Edwards, 1953), which means both men and women are likely to conform to expected roles even in their self-description: men on average perceive their general intellect as higher and they tend to overestimate it, whilst women on average tend to do the opposite (Karwowski et al., 2013)². Women also tend to state more than men that social objectives are more important than the goals connected with achievements (Kuhn and Villeval, 2015; Piirto, 1991). The entrepreneurship literature has explored the role of attitudes and personality traits, such as need for achievement, locus of control, self-efficacy (Bandura), risk aversion etc. in both theoretical and empirical ways, to understand whether female and male entrepreneurs can really be considered to be different but still results are not convergent. It is interesting to point out a recent perspective according to which behavioural differences between women and men entrepreneurs are sometimes minor, if compared to differences among women themselves who perform different kinds of entrepreneurial activities (Pines and Schwartz 2008), thus advocating for a more heterogeneous approach in investigating women entrepreneurs' behaviour. In this section, we explore what the experimental literature in economics can contribute to the understanding of gender differences in these attitudes and traits, and whether and how they may be connected to understanding gender differences in entrepreneurship.

Psychology and experimental literatures and their influence on economics research have resulted in a much better understanding of the apparent gender differences in psychological traits. We know substantially more now on gender differences in attitudes towards risk-aversion, competition, altruism, negotiation as well as in other personality traits such as

² Parents also perceive their sons' intelligence to be higher than their daughters', while children perceive the intelligence of their fathers to be higher than that of their mothers (Karwowski et al., 2013).

extroversion, conscientiousness and openness to experience that might be related to entrepreneurship. Before we revisit this evidence in detail, two methodological points are deemed important. First, the vast majority of these studies are from laboratory experiments, most often than not involving students as participants, while a very limited amount is done with non-student participants or professional directly engaged in the labour market or business activities. Second, the findings of these studies have been related, without much success however, to gender differences in labour market outcomes, such employment rates and pay. Indeed, two major reviews of this evidence by Bertrand (2011) and Azmat and Petrongolo (2014) have both highlighted the lack of evidence on the impact of these differences on labour market outcomes. The fact that these studies relied on laboratory experiments with students rather than experiments in real markets and working environments is a crucial weakness which our current research agenda is attempting to address (more below).

The review of this literature concludes that three traits are found to broadly differ by gender: risk-aversion, overconfidence and altruism. Attitudes towards competition is found to differ by gender only in experiments where the response to incentives have a tournament structure. As much of the evidence on psychological traits comes from experimental studies conducted in the lab - and evidence from case studies conducted with professional women and men often finds much smaller differences (Bohnet, 2016) - we also present evidence from our own ongoing field study of gender differences in preferences amongst professionals, which takes the same experiments conducted in labs to work settings.

A large body of experimental and survey literature documents gender differences in preferences for competitiveness, risk, and altruism (Eckel and Grossman, 1998 and 2008; Gneezy et al, 2003; Niederle and Vesterlund, 2007 and 2011; Croson and Gneezy, 2008; Apicella et al., 2015), and has been variously linked to gender gaps in education (Buser et al. 2014; Niederle, 2010), occupational choices (Bertrand et al., 2010; Goldin, 2014; Bandiera et al. 2016), and gender gaps in pay and career (Babcock et al. 2017a and b; Reuben et al. 2015). Women are actually found to be no less responsive to performance pay than men (Bandiera et al., 2017), no gender differences in performance are found when competing against oneself (Apicella et al., 2017) and when considering size effects there are practically no gender differences in the distribution of risk preferences (for a meta review see Nelson, 2015). A consistent body literature has instead shown that the proportion of women who choose a competitive task is smaller, *ceteris paribus*, across several studies (for a review see Niederle,

2016 and 2017) based on the choice of piece rate rather than tournament payment schemes in experiments conducted in both lab and field. The latter has been used to formulate policy suggestions to teach women to compete more on the one hand, and to focus less on competitive schemes for motivation and remuneration purposes in the workplace on the other. Recent findings from the Global Preference Survey (Falk et al., 2015) also suggest that women tend to exhibit a stronger social predisposition than men, and that they are more responsive to social cues (Eckel and Fullbrunn, 2015; Zetland and Della Giusta, 2013), which features as part of the explanation for another recently studied phenomenon: the effect on women of being offered and accepting tasks associated with low promotability (Babcock et al., 2017 a and b), that is tasks that have to seemingly be endured without real career benefits. In this case, the perception that women are more altruistic functions as a reason for receiving the offers, and the fear of the backlash ensuing when not doing so motivates the acceptances (Babcock et al., 2017b).

An interesting pattern covered by the behavioural literature, which can be closely related to entrepreneurship, is the willingness to take financial risk. Studying micro-entrepreneurship, Berge, Bjorvatn, and Tungodden (2015) look at the impact of business training and business grants on business performance, practice and investment. They further studied the correlation between competitive behaviour measured in the lab with decisions in the field and outcomes. The authors implemented an experiment in an entrepreneurship context, combining lab evidence on preference for competition and field evidence on investment and employment. The findings suggest that competitiveness as measured in the lab identifies important entrepreneurial trait shaping entrepreneurs' decision in the field and to some extent impact field economic outcome as well, such as profits and investments.

Compiling data from an investment game³ collected in different countries from a variety of subject pools, Charness and Gneezy (2012) concluded that women are more financially risk averse than men. The sample includes population ranging from professional traders or bridge players in developed countries to villagers in developing countries. Interestingly, the result is robust to the organisation of the society (patrilineal versus matrilineal). Two other studies have highlighted gender differences in investment allocation, showing that women tend to pursue less risky investment strategy in their retirement asset account (Sunden and Surette, 1998 & Hinz et al. 1997). Hinz et al. (1997) find women to be more conservative than men when investing for their pension. A significant portion of women invested in the minimum-risk

³ The decision maker receives £X and must decide how much of it, £x, he wishes to invest in a risky option and how much to keep. The amount invested yields a dividend of £kx ($k > 1$) with probability p and is lost with probability 1-p. The money not invested is kept by the investor.

portfolio available to them. This could find its roots in women's lower incomes, but the result holds after controlling for economic and demographic variables.

Looking at social attitudes, Arribas et al. (2010) argue that entrepreneurship enters in conflict with pro social behaviour. The authors run an economic experiment including a standard entrepreneurial intention questionnaire associated to an incentive compatible game. The economic experiment aims at capturing entrepreneurial behaviour by presenting an auction to participate in three alternative coordination two player games, named Games I, II and III, which present different risk and payoff levels. Pro-social preferences are measured by the so-known dictator game. The findings provide empirical evidence that individuals exhibiting a more entrepreneurial attitude during the experiment behave less pro socially than others in the dictator game.

Guth et al. (2007) run a bargaining game⁴ in a German weekly newspaper, with individuals ranging from age 8 to 96. The authors found that female participants were significantly more likely to propose an equalitarian split than men. This research suggests that women are relatively more pro-socially oriented, although this result could be explained by risk aversion as, in case of rejection, all receive zero. Running a randomisation control trial, Babcock et al (2017) found evidence that women volunteer more than men for less promotable task. They also find that women are asked to volunteer more often than men are and are also more likely to accept request for such tasks.

In sum, this research tends to argue that entrepreneurship is associated to competitiveness, low risk aversion, and selfish behaviour.

In our current research, our aim is to understand whether men and women in the workplace differ in those typical traits as it is typically inferred from lab experiment with University students. We run a lab-in the field experiment with non-standard pools of subjects: workers coming from different consulting firms characterised by a very competitive environment both internally and externally, and which require digital skills as an essential part of how the businesses are conducted (Poufelt et al., 2017; Van Deursen,, 2014).

We replicate standard experimental protocols developed in the lab for measuring those three attitudinal traits by and large associated to entrepreneurship as developed in the earlier section

⁴ In this game, the proposer (X) suggests how to distribute a pie among himself, the responder (Y), and the dummy player (Z). If the responder accepts the proposal, then all three players receive their corresponding share, otherwise, in case of rejection, all receive zero.

(competitiveness, risk and social preferences). To the best of our knowledge, this is the first time that those attitudes are assessed in a business environment, with real business men and business women instead of University students. Thus far we have collected 61 observations in total across 3 sessions, each following the same experimental protocol. 40.32 percent of participants are women, and the average age is 32.9 (SD=8.34).

The sessions are run during a day event organised by the consulting firm and last about 30 minutes. Participants can earn up to £100, depending on their individual decisions and performance. The experiment is made of 3 parts, measuring competitiveness, social preferences and risk attitudes (see Table X for an overview of our experimental design). The questionnaires were entirely anonymous to avoid any demand effect (participants were allocated random numbers). Treatments occurring in Part 1 and Part 3 were randomised across participants.

Table X - Experimental design summary

Part 1	Competitiveness - Choose between piece rate versus competitive rate Task: solving mazes	
	<u>Control</u> No information about competitor 's gender	<u>Treatment</u> Information about competitor's gender
Part 2	Social Preference - Piece rate. Earnings for a charity of their choice Task: solving mazes	
Part 3	Risk aversion: Choose between a sure rate versus a risky rate (high rate with a 50% chance or else low rate) Task: decoding numbers into letters according to a code	
	<u>Control</u> Earnings for themselves	<u>Treatment</u> Earnings for a charity of their choice

The first part of our experiment aims at testing preference towards competition. We are interested in testing performance in a competitive versus non-competitive environment but also testing the impact of providing information about group composition (in relation to gender), which is known to activate stereotypes and impact performances (ND Gupta et al, 2013). Our experimental design is based on Gneezy et al. (2003) and consists in solving mazes.

Participants are given the choice between Option A (piece rate) and Option B (competitive rate) and are affected to either the control group (no information about the competitor) or the treatment group (information about competitor's gender). Participant could read as follows:

- Option A “5£ for each maze you solve, no matter the number of mazes solved by other participants.”
- Option B “10£ for each maze you solve if you solve more mazes than your co-participant (you will be randomly associated to an other participant {*Treatment: of the opposite sex*} from the group).

Part 1 shows that men and women are equally competitive: 34.78 percent of women selected the competitive rate (payment based on individual performance relative to other's performance) versus 36.36 percent of men (the difference is not significant. $z = -0.120$, $p = 0.90$). This first outcome contradicts lab findings where women typically shy away from competition. Looking more closely at the data, we find women to become more competitive when information about group composition is available (pairs of opposite sex competing), being more likely to select the competitive rate, but also increasing performance. Women's average score increases from 4.27 to 6, (significant at the 10% level. $z = -2.444$, $p = 0.0234$) when group gender composition is made available. Conversely, men's score decreases slightly (6.94 vs 5.85, $t = 1.2751$ $p = 0.2117$). In addition, women are more likely to select the competitive scheme when information about group composition is given (27.27 versus 41.67 percent)⁵, while the opposite happen for men (47.36 versus 21.42 percent). Overall, women are equally competitive and perform better under a competitive scheme, which contradicts earlier findings from standard lab experiments.

The second part of our experiment is designed to test social attitudes. The task remains the same as in part 1 (solving mazes) but the beneficiary becomes a charity: more specifically, the first two mazes are paid to the participant (to better measure the additional effort performed under social motivation) and any other mazes solved above the second is paid directly to the charity of their choice among a set of 10 different charities. Overall, 82.26 percent of the sample contributed positively to the charity, solving successfully more than two mazes, with the same proportion across gender. However, on average, men decrease their performance by 1.18 while

⁵ As this is sub-treatment analysis, the sample size does not enable to run significance statistical tests.

women decrease by 0.39 only, which is significant at the 5% level (-2.0355 $p=0.0467$). This result confirms the greater pro-social orientation of women.

Finally, a third part of the experiment aims at testing risk aversion by asking participants to choose between a sure rate and a risky rate. The task in Part 3 consists in decoding numbers into letters according to a code (Charness et al., 2014). We are also interested in testing the individual versus the social drivers for risk taking and thus added a treatment where participant's earnings would go to the charity of their choice (as in Part 2).

Participants are given the choice between mode A (sure rate) and mode B (risky rate) and are affected to either a control group (earnings for themselves) or a treatment group (earnings for a charity). The rate (high versus low) in mode B is determined by tossing a coin. Participant could read as follows:

- Mode A “5£ for each word you decode, no matter the number of mazes solved by other participants.”
- Mode B “10£ for each word you solve with a 50/50 chance or 1£ for each word you solve with a 50/50 chance.”

The main finding emerging from part 3 is the absence of difference in risk seeking behaviour across gender. Looking at the control group (risk taking when earnings are for themselves), we find men and women to be equally risk seeking: 45.45 percent of men chose the risky rate option versus the exact same proportion (45.45 percent) for women. This stands in sharp contrast with evidence coming from standard lab experiments. Furthermore, when looking at our treatment (risk taking for a charity), we find women taking slightly more risk than men (21.42% versus 15.38%). Although we observe that participants are less likely to take risk for a third party, we find the decrease to be more pronounced for men ($z=1.785$, $p=0.07$) than for women ($z=1.252$, $p=0.21$). Complementing this result, we find that women's performance remains stable between the control group (average score = 6.36) and the treatment with the charity beneficiary (average score = 6.63) while we observe a significant decrease in men's performance (7.4 versus 5.78; $z=2.95$, $p=0.003$). Again, results in Part 3 refutes standard lab experiments findings on gender difference in risk taking, with women equally likely to take risk than men, but also more likely to maintain risk seeking behaviour when a third party is involved.

Overall, this lab-in-the field experiment provides interesting insights that complement those of both field and lab-based research. First, women in consulting seem to have developed a preference for competition and react *positively* to gender priming. This could be the result of a self-selection process into the job market. They nevertheless remain more prosocial, which on the negative side could translate into the acceptance of less career rewarding tasks and have impact on their time allocation, but may also lead to spotting opportunities that men do not see as immediately profitable (Orser and Elliott, 2015). Finally, there is no significant difference in risk aversion between women and men in our sample, suggesting that indeed once selection is taken into account, gender differences in career outcomes cannot be blamed on differences in underlying psychological traits of men and women. It is thus truly essential that more experimental studies in the field are conducted to shed light on the relative importance of barriers to women careers and women entrepreneurship, since much of the evidence on differences in psychological traits is currently relying on lab studies with students or field studies across occupational sectors and very few concentrate on women and men in specific work settings. As the experimental evidence becomes more informative (and is used to assess substantive differences between men and women in the workplace and to inform practices), it is hoped that stereotyping will gradually disappear from academic research too (Bohnet, 2017).

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