

OSBR.CA

The Open Source Business Resource

Editorial

Chris McPhee

Redefining “Women’s Work”: Tensions Between Technology, Entrepreneurship, and Social Reproduction

Tess Jewell

Creating an Environment That Encourages Women Entrepreneurs

Roseann O’Reilly Runte

Which Gender Differences Matter for High-Tech Entrepreneurship?

J. McGrath Cohoon

Building an Infrastructure to Support Women Founders: Lead to Win for Women

Janice Singer and Deborah Dexter

Q&A: Why Is There a Dearth of Women on High-Growth Technology Startup Teams?

Ruth Bastedo

Q&A: Should All Women Aspire to Be Entrepreneurs?

Cate Huston

Recent Reports

[Contribute](#)

JULY
2011



PUBLISHER

The Open Source Business Resource is a monthly publication of the Talent First Network. Archives are available at: <http://www.osbr.ca>

EDITOR

Chris McPhee
chris.mcphee@osbr.ca

ISSN

1913-6102

ADVISORY BOARD

Chris Aniszczyk
EclipseSource
Tony Bailetti
Carleton University
Leslie Hawthorn
Oregon State University
Chris Hobbs
QNX Software Systems
Rikki Kite
LinuxPro Magazine
Thomas Kunz
Carleton University
Steven Muegge
Carleton University
Michael Weiss
Carleton University

© 2007 - 2011
Talent First Network

Editorial

Chris McPhee introduces the editorial theme of Women Entrepreneurs. **3**

Redefining “Women’s Work”: Tensions Between Technology, Entrepreneurship, and Social Reproduction

Tess Jewell, a PhD student at York University and Ryerson University, describes the social and environmental factors that influence women’s career choices and participation in entrepreneurship. **5**

Creating an Environment That Encourages Women Entrepreneurs

Roseann O’Reilly Runte, President and Vice-Chancellor of Carleton University, emphasizes the importance of women’s participation in entrepreneurial activities and their impact on regional economic development, including solutions for cultivating a more supportive environment for women entrepreneurs. **13**

Which Gender Differences Matter for High-Tech Entrepreneurship?

J. McGrath Cohoon, Associate Professor at the University of Virginia and Senior Research Scientist at the National Center for Women & IT, describes research to determine what gender differences might contribute to the unequal gender composition of successful founders. **20**

Building an Infrastructure to Support Women Founders: Lead to Win for Women

Janice Singer and Deborah Dexter, Industrial Technology Advisors for the National Research Council of Canada Industrial Research Assistance Program (IRAP), describe existing programs to support women entrepreneurs and introduce a new program to increase the number of women-founded businesses in Canada’s Capital Region. **30**

Q&A: Why Is There a Dearth of Women on High-Growth Technology Startup Teams?

Ruth Bastedo, President of Experience Media Group Inc., describes the challenges she has faced as an entrepreneur and shares insights into the reasons there are so few women on technology startup teams. **37**

Q&A: Should All Women Aspire to Be Entrepreneurs?

Cate Huston, Software Engineer at Google, reminds us that not all women in the technology sector aspire to be entrepreneurs. In addition to supporting women entrepreneurs, she recommends encouraging and celebrating less overt forms of leadership. **41**

Recent Reports

Contribute



Editorial

Chris McPhee

The editorial theme for this issue of the OSBR is Women Entrepreneurs. In this issue, we examine the reasons for the relative lack of women founders and leaders in technology businesses. Our authors discuss the entrepreneurial challenges that are unique to women and what changes may be implemented to tip the balance and increase the number of women entrepreneurs.

As our authors report, women make up approximately five percent of entrepreneurs in the technology industry. While critics may wonder whether a goal of 50% women entrepreneurs is achievable in the near future, the current disparity leaves few to argue that the numbers should be much, much higher. However, it is not enough to desire change; we must first know how to act and then we must do so.

In this issue, all of the authors are women and they collectively offer a variety of perspectives: entrepreneur, leader, executive, board member, academic, researcher, public sector advisor, and technology expert, among others. Through their research and experience, they shed light on the reasons for the current lack of women entrepreneurs, describe the benefits of having more women entrepreneurs and leaders, highlight what is currently being done to support and encourage women to undertake entrepreneurial and leadership roles, and recommend further specific actions that can be taken by individuals, organizations, and our society in general. We hope their insights will be thought-provoking in the short-term, action-inspiring in the medium-term, and otherwise irrelevant in the long-term, once this inequality has been addressed.

Tess Jewell, a PhD student at York University and Ryerson University, highlights the social and environmental factors that influence women's career choices. By considering recent literature into women's participation in technology, entrepreneurship, and social reproduction, she identifies the biases and stereotypes that create barriers to women's progress in entrepreneurship and beyond, and she offers recommendations to organizations and educational institutions to help women overcome these biases.

Roseann O'Reilly Runte, President and Vice-Chancellor of Carleton University, emphasizes the importance of women's participation in entrepreneurial activities and their impact on regional economic development. She examines proposed reasons for the lack of women's participation and offers solutions to cultivate a more supportive environment that will celebrate and reward the successes of men and women equally, encourage more women to participate in leadership roles, and increase the likelihood of their success.

Joanne McGrath Cohoon, Associate Professor at the University of Virginia and Senior Research Scientist at the National Center for Women & IT (NCWIT), reviews the existing literature relating to gender and the dominant traits of successful high-tech entrepreneurs. She then describes research she undertook with her colleagues to determine which traits are common to large majorities of successful founders and whether there are any gender differences that might contribute to the unequal gender composition of successful founders.

Janice Singer and Deborah Dexter, Industrial Technology Advisors for the National Research Council of Canada Industrial Research Assistance Program (IRAP), introduce Lead to Win for Women, a new program created in Canada's Capital Region to dramatically increase the number of women-founded businesses and to help existing businesses grow substantially. They describe some existing programs to help women entrepreneurs and outline the guiding principles and key features of their new program.

Ruth Bastedo, President of Experience Media Group Inc. and the co-designer of Rotman's Next Steps program for women entrepreneurs, argues that the goal should be to increase the number of women in meaningful leadership positions on startup teams. She describes the challenges she has faced as a woman entrepreneur and shares insights gained working with programs and initiatives to support other women entrepreneurs.

Cate Huston, Software Engineer at Google, reminds us that not all women in the technology sector aspire to be entrepreneurs. She describes her own reasons for not wanting to be entrepreneur, despite frequent encouragement from her network to become one. While she supports initiatives to encourage more women to become entrepreneurs, she argues that we should also encourage and celebrate less overt forms of leadership, particularly those demonstrated through recognizing and filling gaps.

We encourage readers to share articles of interest with their colleagues and to provide their comments either online or directly to the authors. I would also like to extend an invitation to interested readers who may wish to write a column in July, either reviewing the current issue, elaborating on a topic from one of the articles, or sharing related insights.

For the upcoming August issue, we offer a rare unthemed issue and we welcome general submissions on the topic of open source business or the growth of early-stage technology companies. This is a great opportunity to publish your insights without having to wait for a relevant issue theme. Please contact me (chris.mcphee@osbr.ca) immediately if you are interested in submitting an article for the August issue.

Chris McPhee

Editor-in-Chief

Chris McPhee is in the Technology Innovation Management program at Carleton University in Ottawa. Chris received his BScH and MSc degrees in Biology from Queen's University in Kingston, following which he worked in a variety of management, design, and content development roles on science education software projects in Canada and Scotland.

Redefining “Women’s Work”: Tensions Between Technology, Entrepreneurship, and Social Reproduction

Tess Jewell

*“In my experience the largest remaining obstacle is
how to integrate family life with the life of a scientist.”*

Dr. Mary-Claire King

This article considers some of the most recent research into women's participation in technology and entrepreneurship and connects it to the literature on social reproduction in order to paint a more complex picture of the social and environmental factors that influence women's career choices. Specifically, it shows how lingering biases concerning women's reproductive functions continue to shape both men and women's expectations regarding women's aptitudes, interests, and fitness for various roles. These biases and stereotypes create barriers to women's progress at various levels, including the home, the workplace, and educational institutions. The article concludes with recommendations for how educators and entrepreneurs in science and technology can promote the inclusion of women among their ranks.

Introduction

The question of why women are so conspicuously absent from the fields of science, engineering, and business has been asked many times and received vastly differing answers. Responses often take the form of a heated debate between nature and nurture. Among the many hypotheses put forward by academics and lay authors alike are the following:

1. Women are too uncompetitive or risk adverse and thus less successful than men (Mansfield, 2006; <http://tinyurl.com/3qhu7nn>).
2. Women have less interest or aptitude than men in science and technology (Lawrence, 2006; <http://tinyurl.com/3dbkq9f>).

3. Career expectations in these fields follow a normative male model that inherently privileges men and disadvantages women (Marlow and Patton, 2005; <http://tinyurl.com/3lcbxd5>).

While some of these hypotheses touch on actual obstacles impeding women's success in business in technology, all of them need to be qualified by a further investigation into the social, structural, and economic conditions that underlie these obstacles. Consequently, this article will consider some of the most recent research into women's participation in technology and entrepreneurship and connect it to the literature on social reproduction in order to paint a more complex picture than any one of these single perspectives provides.

Redefining "Women's Work"

Tess Jewell

This article will begin with a brief critique of the debates about women in technology and entrepreneurship, and in society more generally. This will be followed by a discussion of women's experiences of science and technology programs in university. Next, it will consider women as entrepreneurs more generally. Third, it will examine women's relationship with social reproduction. The article will conclude with recommendations for how educators and entrepreneurs in science and technology can promote the inclusion of women among their ranks.

A Feminist Critique of Research into Women in Business

Before examining the subjects of women in entrepreneurship and technology, it is important to note a few caveats when discussing research into issues affecting women. The first caveat is that women do not constitute one homogenous group but rather a spectrum characterized by differences in race, class, ethnicity, age, ability, gender identity, and sexual orientation, among other things (Holvino, 2001; <http://tinyurl.com/3to4pmm>). One of the primary critiques levelled at much organizational research in this area is that it does not take these differences into account, instead privileging sex over all other aspects of identity (Holvino, 2001; <http://tinyurl.com/3to4pmm>). This focus necessarily ignores intersectional or contextual analyses that examine how sex interacts with other identity characteristics to change a particular group's experience (Tatli and Ozbilgin, 2010; <http://tinyurl.com/5v3rwyu>). While recent reports on the status of women in traditionally masculine fields do include analyses based on race and ethnicity, the vast majority of the data are disaggregated according to sex alone (Hill, Corbett, and Rose, 2010; <http://tinyurl.com/3lnq4gy>).

A second important critique is that men are generally presented as the benchmark against which women are measured, a research methodology

that implicitly continues to assume that masculinity is the status quo and that femininity is the difference that needs to be explained (Holvino, 2001; <http://tinyurl.com/3to4pmm>). This perspective has dominated since the early 19th century's debates on the role of women in society ("The Woman Question") and dates back to the earliest recorded writings of classical philosophers trying to define the mysterious nature of woman (Woodbridge, 1984; <http://tinyurl.com/3gmbkl4>). Comparisons are unavoidable when describing the presence of perceived differences between two groups, but quality research examines the reasons behind the disparity on both sides (i.e., for both men and women, not women unilaterally). Even when the methodology used examines all perspectives equally, the language used to describe the results or even the research question itself can define masculinity as a neutral norm: for example, consider the change in problem definition that would be caused by renaming the American Association of University Women's report "Why So Few?: Women in Science, Technology, Engineering, and Mathematics" (Hill, Corbett, and Rose, 2010; <http://tinyurl.com/3lnq4gy>) to "Why So Many Men?"

These critiques apply to the sections that follow in that this article is necessarily constrained by the previous research available, which may or may not take contextual analyses into account or succeed at making comparisons without implicit biases. For example, while this article will attempt to focus on North America as its area of analysis, assuming that all women in this group share the same experiences neglects not only regional differences but also the experiences of immigrant women, especially those from nations where women's acceptable roles are more constrained. Consequently, further research is required to develop a clearer conception of the issues facing women located at any given point along the spectrum, in relation not only to men but also to each other.

Redefining "Women's Work"

Tess Jewell

Women in Science and Technology

To determine why women entrepreneurs are uncommon in technology, a first set of questions to consider is how and why women decide (not) to pursue studies or careers in these fields.

One argument that has received statistical support is that women and girls are generally less interested in science and technology, engineering and math (STEM) (Corbett, 2011; <http://tinyurl.com/3lbttx4>). However, since personal preferences and interests are influenced from birth by a multitude of external factors including the values and opinions of one's parents, friends, culture, class, and society, this statistical difference requires further investigation to understand its roots. Note that this focus does not assume inherent differences between men and women in terms of aptitude as some academics have done (Lawrence, 2006; <http://tinyurl.com/3dbkq9f>).

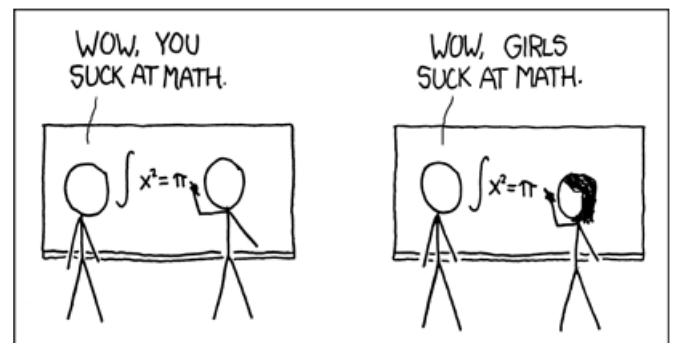
With the goal of examining both personal and external factors, the American Association of University Women (AAUW) produced a report (Hill, Corbett, and Rose, 2010; <http://tinyurl.com/3lnq4gy>) that demonstrates eight reasons why fewer numbers of women pursue careers in STEM fields, generally related to social and environmental factors, educational climates, and continuing biases:

1. Beliefs about differences in intelligence
2. Stereotypes about both men and women
3. Women's self-assessment
4. Differences in spatial skills
5. The university/college student experience
6. Attitudes of university and college faculty
7. Implicit biases regarding women's interests and abilities

8. Workplace biases about women's competence and likeability

The complex picture that the AAUW report presents is one of barriers at many levels. According to its findings, biases in the perspectives of parents, educators, and institutions can have a major influence on girls' and women's interests as well as their assessments of their own aptitudes. Other studies have corroborated the fact that women often rate their skills and abilities below those of their male colleagues (Grant, 1983; <http://tinyurl.com/3uu8f29>). Girls show high levels of interest and aptitude in science and math in childhood, and this interest only declines with age as negative biases and stereotypes increasingly come into play (see Figure 1). When girls are encouraged to learn about STEM and given validation and support for their abilities and interests, they are far more likely to be successful.

Figure 1. "How it Works"



By Randall Munroe (<http://xkcd.com/385/>)

Licensed under a Creative Commons Attribution-NonCommercial 2.5 License

Another social barrier that the AAUW report does not mention but that fits in the context of stereotypes and biases is perceptions of opportunities for social relationships in STEM fields. According to discussions surrounding the recent introduction of Mattel's computer engineer Barbie, some women believe that STEM occupations carry negative stereotypes that will impede their ability to attract romantic partners (<http://tinyurl.com/yeff9s3>). Although websites

Redefining "Women's Work"

Tess Jewell

such as Geeks are Sexy (<http://geeksaresexy.net>) are attempting to rehabilitate the image of “the geek”, science and technology are still strongly associated with social awkwardness in the popular imagination, as evidenced by the success of primetime television programs such as *The Big Bang Theory* (<http://tinyurl.com/2h5urt>).

The fear of social stigma may be inherited as much from pop culture as from the attitudes of parents: one female computer science major has recalled her mother warning her she would “never find a boyfriend” in her program of choice. Blogger Ruby Slater has also perceived this concept at play in the subtexts of a recent book aimed at teaching girls about the benefits of studying computer science (<http://tinyurl.com/3fscpkq>). Specifically, she notes that *The Princess at the Keyboard: Why Girls Should Become Computer Scientists* places a high degree of emphasis on the married status of the successful women computer scientists it presents as examples, as if to say, “Don’t worry, girls. Computer scientists can land a man and procreate.”

This association of STEM fields in particular with aloneness is interesting considering the also widely held opinion on the Internet that finding a husband during university is practically impossible regardless of discipline (<http://tinyurl.com/3dc28xr>). However, it makes sense given the AAUW’s reports of women in STEM departments experiencing high levels of isolation and loneliness during their degrees.

This isolation may also be due to lack of respect or feelings of women’s lesser competence or likeability compared to men in the same field or position (Grant, 1983; <http://tinyurl.com/3uu8f29>). According to Stanford neurobiologist Ben A. Barres (2006; <http://tinyurl.com/dc8ng4>), professional women in these areas also receive less respect than their male counterparts. Uniquely positioned to comment on the experiences of both men and women due to his mid-

life transition from female to male, he reflects that “the main difference that I have noticed is that people who don't know I am transgendered treat me with much more respect: I can even complete a whole sentence without being interrupted by a man.”

Similar attitudes toward women may also contribute to the extremely low number of women who participate in the open source community (according to recent studies, women comprise as little as only 1.5% of all open source developers) (<http://tinyurl.com/ygl7vg7>). Portrayed as constituting an “old boys network” (<http://tinyurl.com/6gqxc5x>), male open source developers are credited with making publicly misogynistic comments that alienate women and discourage them from participating in projects. For further discussion of related issues, see the June 2009 OSBR issue on “Women in Open Source” (<http://tinyurl.com/meoet5>).

As we will see next, these concerns about likeability among successful women in STEM fields also apply to women in business.

Women in Entrepreneurship

One of the principal explanations given for the relative absence of women entrepreneurs is that women are too risk adverse or insufficiently competitive to succeed in this area (Mansfield, 2006; <http://tinyurl.com/3qhu7nn>). However, recent studies (Benenson et al., 2011; <http://tinyurl.com/3jqxqbc>) have shown that women are indeed both competitive and risk-taking, but that they use different strategies and demonstrate these qualities in a different way.

Regarding risk in particular, stereotypes that associate risk-taking with masculinity and cautiousness with femininity have been criticized in detail. As “Risky Business: Busting the Myth of Women as Risk Adverse” (Gupta et al., 2009; <http://tinyurl.com/3zvebg4>) discusses in depth,

Redefining "Women's Work"

Tess Jewell

a survey of 650 women managers found that while those surveyed were less likely to take explicitly financial risks, over 80% reported having pursued high-risk professional opportunities, many of which involved risking personal capital. Their overall findings suggested that women were just as risk-taking as men but were caught in a double bind: stereotypical notions about women's risk adversity cause their aptitude to either go unnoticed or be perceived negatively as "cockiness".

Instead of lesser aptitudes for entrepreneurship, a different consideration that may instead be holding women back from achieving the same levels of success as men is access to the start-up capital needed to establish new businesses. According to Susan Marlow and Dean Patton in "All Credit to Men? Entrepreneurship, Finance, and Gender" (2005; <http://tinyurl.com/3lcbxd5>), women not only begin new businesses with fewer finances, but also experience additional barriers to acquiring other sources of capital as compared to their male counterparts. As cited in the 2010 Scorecard of the National Center for Women & Information Technology (<http://tinyurl.com/3kr9omo>), female-owned businesses rely primarily on internal sources of start-up capital, while male-owned business have greater access to external sources. Further, female-owned businesses begin with approximately 55% of the start-up assets and 37% of the first-year revenues and profits reported by male-owned businesses,

As the Simmons School of Management published in 2009 (<http://tinyurl.com/3cghkr2>), women own 40% of all businesses in the United States but only receive about 5% of venture capital investment. There are various reasons for this disparity at the institutional level, primarily relating to implicit biases in what venture capital firms value in applicants and business models. Although men and women may have different communication styles, it is important to note that behavioural expectations of men and wo-

men differ, so that even women who exhibit so-called masculine traits of assertiveness and risk-taking will not be perceived the same way as similar men. Overall, the consequence of this disparity is that women entrepreneurs beginning new businesses with lower amounts of start-up capital will necessarily be constrained from investing in higher levels of innovation and thus be unable to generate as much growth as better-funded firms.

Women and Social Reproduction

A theme that has begun to emerge in the preceding sections is the influence of societal and personal expectations relating to social reproduction on women's academic and career paths. According to feminist political economy (Luxton and Corman, 2001; <http://tinyurl.com/3wn7lml>), social reproduction is defined as "the activities required to ensure day-to-day and generational survival" and tends to refer to the (often unpaid) domestic labour involved in maintaining and reproducing a healthy workforce: acquiring and preparing food, providing clean clothes, child-rearing, elder care, etc. Women have been responsible for the majority of this work throughout history, and recent studies have shown that this remains the case even in the most advanced Western nations today (Bezanson, 2006; <http://tinyurl.com/43ml8mh>).

Women's association with social reproduction influences the professional opportunities available to them in at least three ways: i) by maintaining stereotypes and assumptions about women's characteristics and fitness for various roles; ii) by shaping women's self-assessment and career aspirations; and iii) by creating barriers to certain kinds of employment or risk-taking due to the additional burdens of care work.

Regarding the first two points, women's role in social reproduction is intrinsically linked with beliefs about women being nurturing, emotional, and empathetic in nature, attributes that are

Redefining "Women's Work"

Tess Jewell

considered inferior to the logical and analytical nature supposedly possessed by men (Lawrence, 2006; <http://tinyurl.com/3dbkq9f>). Among other effects, persistent attitudes regarding women's responsibility for care work have such repercussions as discriminatory practices relating to hiring and the availability of credit. According to UN Women, the United Nations Entity for Gender Equality and the Empowerment of Women (<http://tinyurl.com/4d7qn47>), women continue to be paid less than men, have less job security, and have less access to both higher wage work and financial support for starting small businesses. However, this is not due simply to institutions valuing men and women differently: as Dr. Sean Lyons has discussed (<http://tinyurl.com/3zs83ar>), women also have consistently lower expectations regarding career salaries and advancement, especially in traditionally masculine fields, and potentially due to their desire to balance work with personal life.

The burden of responsibility for social reproduction can also constrain women's ability to succeed in or even pursue certain kinds of work. As noted by Dr. Mary-Claire King (<http://tinyurl.com/3pynz8j>) regarding the need for institutional commitment to support working mothers, the ability to find adequate childcare has a significant impact on the careers of women scientists in academia: "At institutions where there is child care on site, where it is subsidized, where there are enough places for assistant professors to have their children, women do well. And at institutions where it is assumed that you will make your own arrangements, women do less well." Of equal importance in her statement, however, is the fact that childcare considerations have no such notable impacts on science academics who are also fathers. Responsibility for childcare is also cited as a reason why women developers are conspicuously absent from open source, since women with families are less able to commit to working the evenings and weekends that international projects often require (Weiss, 2005; <http://tinyurl.com/6gqxc5x>).

Notably, childcare is not the only aspect of social reproduction that has a major impact on women: another is eldercare. As Dr. Linda Duxbury (<http://tinyurl.com/3bn7bkm>) has noted, both women and men are choosing to have fewer children and start their families later in life in order to focus on careers; however, aging parents are inevitable and few community supports are available to provide needed care, thus downloading full responsibility onto the family.

In terms of the ability to pursue entrepreneurship, responsibility for care work combined with limited financial resources can severely impact women's risk tolerance. Women's average financial situation tends to fall below that of men; UN Women even estimates that women constitute 70% of the global poor (<http://tinyurl.com/4d7qn47>). On a more local level, Statistics Canada reported in 2007 that women represent 80% of all single-parent households (<http://tinyurl.com/3www2df>), and in 2009 that significant gaps in earnings (up to 20–30%) developed between women with and without children over time, largely attributed to career interruptions due to child-rearing (<http://tinyurl.com/6zpp3h3>).

Having already noted the impact of start-up capital on new ventures and women's decreased access to funding, the connection between women and lower income explains a significant barrier to the success or size of new businesses. For the common scenario of single mothers who are wholly responsible for both breadwinning and social reproduction, the reality is that they do not have the time or money to invest in entrepreneurship. Forget risk adversity: women in this position simply have no risk tolerance.

Current Solutions and Future Recommendations

Many initiatives are currently in place to encourage more women to pursue paths in science, technology, and entrepreneurship. Among these

Redefining "Women's Work"

Tess Jewell

are programs like Michigan Technological University's Get WISE (<http://tinyurl.com/6bld7w7>) and NASA's Women in STEM High School Aerospace Scholars (WISH; <http://wish.spacegrant.org>) program that invite high school girls to explore science and engineering. Other initiative like MentorNet (<http://mentornet.net>) and Canadian Women in Technology (CanWIT; <http://catawit.ca>) aim to provide support and mentorship for women already in STEM careers.

Regarding entrepreneurship, universities and not-for-profit organizations have begun offering scholarships to attract women into entering management programs (<http://tinyurl.com/3z5594l>). In the United States, a new national startup alliance has been announced that will promote and support increased diversity in high-tech businesses (<http://tinyurl.com/3rchsfr>).

At a more juvenile level, toys like computer engineer Barbie (<http://tinyurl.com/yeff9s3>) and the recent influx of pink-coloured computer accessories (keyboards, mice, laptops, etc.; <http://tinyurl.com/3mt3jyk>) are hoped to encourage young girls to take up a greater interest in computer science and engineering.

However, while these various initiatives may well increase the interest of women and girls in both STEM and entrepreneurship, they are not sufficient to alleviate implicit assumptions about women's nature and their supposedly natural association with social reproduction and care work. In order for women to reach their maximum potential in these areas, the responsibility for care work and normative male models of employment that do not leave room for balance between personal and professional life will need to be shifted. Clearly these shifts require long-term changes to social structures that are beyond the scope of this article.

In the meantime, however, there are certain things that organizations and educational insti-

tutions can do to help promote women and girls' self-confidence and interest in science, technology, and entrepreneurship:

1. Provide training to increase awareness of implicit biases against women. For example, instructors and investors who have learned to recognize their own assumptions and understand the different ways women are socially constrained to communicate may be more likely to evaluate the merits of female candidates on par with similar male counterparts. As a start, Harvard University provides an exercise to help reveal implicit biases (<http://implicit.harvard.edu>).
2. Promote inclusive workplaces and academic departments. Encourage women to become integrated into the community through mentorships and social events.
3. Continue to make visible successful women in entrepreneurship and science and technology, and provide young women entering these fields access to female faculty and industry role models.
4. Begin teaching girls about science, technology, and entrepreneurship earlier in life. Many North American high school curricula have finally begun teaching business studies over the past few years, and independent organizations exist to support youth in pursuing entrepreneurship (<http://nfte.com>, http://thesekidsmeanbusiness.org/educators_guide/). Tailor individual programs or events to increase girls' interest and provide them with the additional social and intellectual skills they need to be successful in male-dominated areas.
5. Provide flexibility in working arrangements and offer childcare services/support to help attract and retain female faculty at educational institutions. Offering flexibility and support to female students will make it possible for a broader spectrum of women to complete degrees while balancing care responsibilities.

Redefining "Women's Work"

Tess Jewell

6. Perform more specialized research into conditions affecting women in different contexts to learn more about what is required

Overall, the key issue at the root of all others is how society imagines women's abilities, interests, and suitability for various roles. One major step in promoting increased numbers of women professionals in STEM and entrepreneurship is to implement institutional change coupled with programs that alleviate the burden of social reproduction (such as national child-care). At the same time, however, it is necessary to teach both young girls and boys to believe in the value of girls and the diversity of personal and career opportunities available to them.

Conclusion

To demonstrate why few women pursue careers in science, technology, and business, this article has examined some of the most recent research into the social and environmental factors affecting women in these areas. The results of considering women's experiences as children, wives, mothers, students, professionals, and entrepreneurs found that social pressures related to women's so-called need to marry, procreate, and provide care for a family were common in all fields. In other words, societal structures and expectations that continue to impose most of the responsibility for social reproduction onto women provide a major barrier to their success in

two ways: i) by requiring women to commit a significant amount of time and effort to unpaid care work instead of career advancement, and ii) by perpetuating stereotypes and implicit biases that women are, by nature, best suited to this type of care work and less suited for more intellectual pursuits. The recommendations provided are intended to help women and girls see past these biases by helping them discover their own aptitudes and interests in technology and business, successful role models to follow, and welcoming communities to join. However, on the long-term, what is most needed is a redefinition – or better yet, an eradication – of the concept of “women's work”, so that responsibility for social reproduction is balanced equally between men and women. Based on the current state of the industry, only when women become able to choose their own career paths without social repercussions will they achieve equal levels of participation and success in these areas.

Tess (Teresa) Jewell is a PhD student in the Communications and Culture program hosted jointly by York University and Ryerson University in Toronto. She holds Bachelor's and Master's degrees in English with a focus on Medieval Studies. Her current research interests include the experiences of women in business as well as in other male-dominated contexts such as video game communities, open source projects, and geek culture in general.

Creating an Environment That Encourages Women Entrepreneurs

Roseann O'Reilly Runte

"We will never close the achievement gap until we close the ambition gap."

Sheryl Sandberg

If women do not participate fully in entrepreneurial activities, we lose half the potential of our society and economic development will be limited. Women who do take on entrepreneurial roles succeed admirably. Thus, their participation is all the more important. This article cites a speech by Sheryl Sandberg, Facebook's COO, in which she offers several reasons for women's lack of participation and leadership. These factors are discussed and several solutions are proposed which could contribute to making the environment of a community more supportive and conducive to the successful participation of women in leadership roles.

Introduction

Economic development and market growth constitute viable means to parry the threats of recession and unemployment. As competition on the international marketplace becomes ever stronger, each nation and each region will need to cultivate its unique resources and strengths. In Canada, we need to focus on creative ways to expand our current activities in areas of strength.

Canada's strengths have always resided in our resources and we have excelled in exporting the raw materials of our forests, mines, agricultural tracts, and rivers. Today we realize that the possibilities of expanding this market are limited because the resources themselves are limited. We also face increased difficulty in extracting and transporting these resources safely because their location is ever less accessible.

In a world where high technology and digital communications hold great value, a highly educated and skilled population is key to current and future economic success. Our college and university graduates constitute our most precious and most renewable resource for the future.

Yet, the population of Canada is not growing and thus we must encourage all citizens to participate in the economic development of the country. While we note that the number of women graduating from university has increased to equal, and in some areas exceed, the number of men, we have not yet seen a similar increase in women holding positions of great responsibility. However, there are some encouraging signs, particularly among women entrepreneurs. One need only note the impressive statistics listed by Deloitte in the advertisement for the 2011 RBC

An Environment That Encourages Women Entrepreneurs

Roseann O'Reilly Runte

awards recognizing women entrepreneurs, which boldly proclaims the significant role they play in Canada (<http://theawards.ca/cwea/>). The invitation for nominations states that women entrepreneurs:

- represent one of the fastest-growing business segments in Canada
- run firms that create new jobs at four times the rate of the national average
- collectively provide more jobs than the Canadian Top 100 companies combined
- create companies at double the rate of the national average
- have doubled the number of women with incorporated businesses in the last decade
- number 821,000 self-employed individuals who contribute \$18 billion to the Canadian economy

These statistics tell an interesting story for those of us who would like to improve the success of our national and regional economies. The story is that women are capable of extraordinary success and that we need their full participation. The story leads naturally to the question of how one might cultivate this success, how one might encourage more women to participate in local, regional, and national economic development.

On one hand, of course one might claim that, since the participation rate of women is lower than that of men overall, those participating likely exhibit best the qualities required for success. In other words, increasing the number of women in business is not a guarantee of increased levels of success. On the other hand, if their success is no more than equal to that of men, exploring ways to enhance their likelihood of participating is worthwhile.

Overcoming Challenges

In the important book, *Half the Sky* (<http://www.halfttheskymovement.org>), authors Sheryl WeDunn and Nicholas Kristof identify the oppression of women and girls around the world as the major challenge of our century. In previous times, the world has abolished slavery and ended totalitarianism. They say that we should resolve to make the rights of women the issue of the current century. If we are to be leaders in the world, we should be able to demonstrate that the developed world offers a model. Yet the figures do not demonstrate equality. In the words of Sheryl Sandberg, Facebook COO: "Men run the world. Of 190 heads of state, nine are women. Of all the parliaments around the world, 13% of those seats are held by women. [Of] corporate America's top jobs 15% are [held by] women; numbers which have not moved at all in the last nine years... Of full professors around the United States, only 24% are women." (<http://tinyurl.com/3s8d5hn>)

Sandberg shared these statistics during a recent address at Barnard College, in which she also identified a series of reasons why women may not be as successful in their careers as their male counterparts. The first reason was ambition. She challenged women to "think big." If women do not close the "ambition gap," she said, they will not eliminate the "achievement gap." She indicated that from a young age, women may calculate how many hours they need to dedicate to other responsibilities, and reduce career aspirations even before they begin. They may not attempt to climb the corporate ladder beyond a certain level in order to dedicate time to family.

Sandberg also indicated that women need to believe in themselves and their capacity to achieve. They should not always attribute their success to good fortune or the combined efforts of the team. They underestimate their performance and their potential.

An Environment That Encourages Women Entrepreneurs

Roseann O'Reilly Runte

The third reason she identified was the correlation between likeability and success. The more successful and powerful men become, the more they are liked. The opposite is true of women. They are judged harshly by others (both men and women). Thus, women may either become victims of their success or of their likeability, which stands in the way of achievement.

The fourth reason was the cost of success in terms of personal sacrifice. While the workforce has become more open to and welcoming of women, it is not possible for every woman to be “superwoman” – mother, CEO, driver, cook, and caregiver at once. Women make choices and often, the decision is to forgo the highest level of performance at work in favour of a balanced lifestyle. Women ask themselves if success is worth the hardship.

The final reason Sandberg gave was fear of failure. This actually related back to the belief in self and confidence which women lack, fail to express, or both.

Sandberg's points would actually be equally valid for men and women. We all need to believe in ourselves to be leaders, be ready to sacrifice for success, be courageous and prepared to look failure in the eye, and accept the fact that leaders are not always liked. Indeed, her first point about self confidence is universally valid. On the other hand, accepting credit for work well done is sometimes associated with a lack of modesty and an oversized ego. Sharing praise with team members is positive and creates goodwill.

The question of sacrifice is, based on many surveys, quite real for men and women. Women, however, still tend to accept a greater level of responsibility at home and spend more time with children. If we wish to attract more of them to business, we need to support them in such a way that the need to sacrifice is diminished. In the latest issue of the *Harvard Business Review*, the

story of Genpact's CEO, Pramod Bhasin, who built “an industry in India from scratch,” is edifying (<http://tinyurl.com/3lzwjme>). When Bhasin set up his base in a suburb, he simply created all the necessary services to enable the hiring of the large numbers of employees needed. He created cafeterias and hired a transportation company to bring people to work. He simply calculated this as part of the cost of doing business. When hotels wanted to bring women business travelers to their establishments, they surveyed women and then added to their suites the items women wanted. If we want to attract women entrepreneurs, we need to create the climate in the workplace and in our communities which is supportive of their participation.

The question of likeability is related to the definition of qualities. Over the years, it has been noted through studies of reference letters, that similar traits may be viewed as negatives for women and positives for men. Aggressive males are seen as ‘assertive’ while women displaying the same characteristic may be deemed ‘pushy’. The question of likeability is, however, symptomatic of the views of society in general. Not only does this perception make it more difficult for women to wish to be seen as strong, thereby risking not being admired, but it also means that if successful women are not liked, then others will not wish to emulate them. One only need think of women heads of state and the treatment they receive in the press to conclude that whatever style they adopt, whatever policy they propound, whatever they do or do not do, they will generate more criticism than their male counterparts. Young women desiring to take on powerful roles and positions of leadership need to be prepared to endure negative commentary. It is, unfortunately, not simply a question of a few slings and arrows. It is also a question of limiting one's opportunity to find a spouse, to have friends, to live in the community as part of it. Successful women may well be invited to sit at the head table of the banquet hall. They are not usually invited

An Environment That Encourages Women Entrepreneurs

Roseann O'Reilly Runte

to the neighbourhood pot-luck supper. If they attempt to soften their image, they are subject to criticism. If a successful, corporate businessman is seen picking up his children after a soccer game, he is considered quite a hero and this is considered a sign of his humanity. If a woman does, one wonders how she has time, if she should not be at work or doing something else and why would she be wearing whatever she is wearing?

Encouraging Women to Participate

Simply taking these points and looking at the possibilities for developing a region's economy, one might consider a number of positive steps to improve the participation of women. Solutions include targeting businesses which would be attractive to women, offering services which would enhance their ability to combine their responsibilities at home and in the workforce, creating an environment where women's participation is valued, where the qualities they bring with them to the workplace are respected and where their success is applauded.

Women are invariably active in non-profit organizations. It is only a small step from being a volunteer to being an employee and another from being an employee to running an agency or starting one's own non-for-profit business.

There are more women university graduates in the arts, humanities, and social sciences than in science, business, and engineering. Rather than consider this a negative, one might consider what they have to offer. In a globalized world, the ability to communicate in more than one language is a great asset. Even locally, banks with branches in Chinatown hire Chinese-speaking staff. If a business major can learn Chinese, a Chinese major could learn finance and accounting. The addition of a minor in entrepreneurship, open to majors in every field, is a brilliant

innovation of the Sprott Business School Faculty at Carleton University (<http://sprott.carleton.ca>).

The participation rates of women in the field of engineering have improved slightly over the years, but there is still quite a way to go. Whenever one wishes to encourage minority participation, the author's experience suggests that a critical mass of 30-40% is required. A bold suggestion would be to offer significant scholarships to the top women applicants until the critical mass is obtained. One might do the same for males in fields such as nursing. Examining the numbers, one may observe that the women who have gone into engineering may group themselves in certain fields, especially those involving interdisciplinary content such as environmental engineering. If one created business opportunities bringing together the content creation and the software and hardware production, one would not only have cutting-edge products but a diverse workforce.

We also need to think ahead. For example, the regulation of currently expanding fields will require new abilities and new specializations. International standardization will become a growing issue as markets continue to globalize.

There is a need for courses and programs such as the Lead to Win program (<http://leadto-win.ca>) at Carleton University and the course on Innovation for women CEOs at Harvard (<http://harvard.edu/>). There are many talented women who have not had the opportunity to learn about entrepreneurship. They were not necessarily encouraged to follow male role models and there were very few successful women in business to emulate.

Requirements for obtaining loans and getting a business off the ground need to be fair to all and must be known by all. Successful entrepreneurship depends on a solid base of knowledge, of

An Environment That Encourages Women Entrepreneurs

Roseann O'Reilly Runte

“how-to” practicality, and of agencies open for business with all. I shall never forget meeting a woman who told me she had been refused for a loan by three banks. I looked at her papers. Everything was perfectly in order. There was absolutely no reason she should have been refused. As I mused about the situation, I asked her what she had worn to the bank. I had her make an appointment for the next day and lent her a suit and a briefcase. She came back with the loan. The same thing might have occurred for a male who was not well dressed. The problem was that she had no idea that her appearance would matter. She was a brilliant entrepreneur but had not learned to sell herself.

Service companies need to be encouraged. Day care is an obvious need as well as drop-off centres where children can be left while parents run a few errands. In some cities, one can shop for groceries online and pick them up on the way home from work or have them delivered. Dry cleaners pick up and deliver. Car dealers will take the car for servicing and return it to one's place of work. Concierge services will go to one's home to cover when deliveries are expected or repairs need to be done. How many days a year of work are lost by people waiting for repair companies who promise to arrive “sometime between nine and noon”? How many really bright women would migrate to work in a city where such services were available? Regulations surrounding day cares and drop offs might be eased to permit cooperative ventures and businesses might offer subsidies for such services in lieu of memberships to golf clubs. Businesses might offer a service to pick up children from day cares that close when parents have to work late.

The organization of the community is also important. If schools and essential services are located in proximity to residences, then time is saved making people more productive. If the needs of working women are taken into consideration in planning housing, then they will ad-

opt communities more readily. Safety, ease of access, and decreased need for maintenance are, along with proximity to services, all important issues.

Across North America and Europe, communities are busily declaring themselves “wireless”. Entire cities and neighbourhoods, not just cafés, offer free internet services. New communities with front porches on the street to encourage neighbourliness and places for children to play safely are sprouting up everywhere. The community that could declare itself friendly to working women would be highly prized.

The physical environment and services are visible and relatively easy to resolve. There are costs associated, but the costs of not investing in promoting the possibility for women to succeed, are also great. In a competitive economy, in a “flat world”, people are mobile and populations follow employment opportunities, which in turn depend on the amenities that attract business development. In a world where innovation is prized, inviting the full participation of all is essential. In a country where the population is not increasing, all must be able to share the best of their talents and abilities.

The final problems are the most difficult because they are the result of perception, steeped in tradition. Traditions can and do change. Since 2001, the author has sat on the Board of Directors at the National Bank of Canada, rated by Bloomberg as the number one bank in Canada and number three in the world (<http://tinyurl.com/3g2ba2l>). In 2009, under the leadership of Mr. Louis Vachon, President and CEO, and Mr. Jean Douville, Chair of the Board, the bank adopted a governance policy whereby future nominees to the Board will be represented equally by women and men. Any company could make the same decision and the success of the National Bank of Canada demonstrates that such a policy does not negatively affect returns, security, or reputation.

An Environment That Encourages Women Entrepreneurs

Roseann O'Reilly Runte

Recognizing Achievement

Well-meaning organizations have been diligently creating awards for women, thinking that these awards will encourage more women to be entrepreneurial. Women recognizing women or even companies attempting to appear, or to be, encouraging and supportive by offering prizes, is an interesting concept. What if there were the Nobel Prize in Physics and then the Women's Nobel Prize in Physics? Would the women's prize be considered to be of equal value? Recognizing women is a good, first step but giving them equal recognition with men would be the next step.

Anyone who has served on numerous prize and award selection committees, will agree that in general, most of the nominees will be men unless the award is specifically for women. Thus we must all nominate women. This is easier said than done. Nominations take a good deal of effort. When one is not successful with a nomination, it is difficult to determine to repeat the process. There is the fear-of-failure factor which will come into play along with the consciousness of the simple fact that winning will bring as many negative comments as positive ones. What can be done to reward women in small ways that will not involve big contests, lots of publicity, and the consequent negative reaction? Rather than reward the Woman Entrepreneur of the Year, one might offer a small prize, like a small gift certificate, to every employee in the company that showed the strongest growth or that provided the most supportive environment for employees? This would focus not on the individual but on the team and the reward would be shared. We might also offer rewards for those who nominate others.

When women are successful, what can we do to make the next generation of women and men view their success as normal and even admir-

able? We need to promote images of women who succeed on their own terms. They must populate the pages of the business cases at the best schools. They must be in pages of our newspapers and not the fashion magazines. They must be in our popular fiction and films in roles other than the evil boss, or jealous, scheming co-worker. Women have long played the temptress (Eve), the mother (the wife of *Father Knows Best*), or the zany broad (*I Love Lucy*). The hard-working Cinderella is rewarded, not for work, but for her beauty (and shoe size) which are only recognized when she has a nice dress and shoes. The real heroine is the fairy godmother and we need a few more of them both in real life and in literature. That would be a terrific role model, and while even the good fairy godmother has to contend with bad fairies and evil stepsisters, this situation is but a reflection of reality. In addition, turning mice into footmen and pumpkins into coaches can be usefully transferred to inventing new solutions to old problems.

We should teach all women and men to be strong and to admire strength in others. Grading systems in academic institutions and reward systems at work must promote value in supporting others, in being creative. When we do so, we will no longer need fairy tales for inspiration or example.

Conclusion

With strong, targeted educational opportunities, appropriate services, expansion of non-profit activities, an emphasis on industry and opportunities that match the talents and experiences women bring to the marketplace, creation of the appropriate regulatory environment, and community housing and safety programs, a region can support the participation of women and encourage women to take on leadership roles. If a region undertakes to be supportive of women entrepreneurs, it will cultivate a precious re-

An Environment That Encourages Women Entrepreneurs

Roseann O'Reilly Runte

source. As regions compete for business in the future, the regions with such environments will be most attractive to both men and women and will succeed in economic expansion.

Women entrepreneurs should be encouraged by role models and aided by mentors. Women should be rewarded equally. There should one day be no need for special awards for women because they will receive their equal share of recognition in fair competitions. We also need to create new narratives of success for women and men alike. These stories should become part of our culture and affect the aspirations of our youth. Tales of women and men who achieve greatness through entrepreneurship, through dedication and hard work, through collaboration and sharing praise and rewards, will add to the culture of success that we need to create for women and men who suffer from self doubt, fear of failure, and a desire to be accepted and liked. This is one, positive way to eliminate the stigma associated with success for women. The civilization that achieves this goal might even double its output without using up its natural resources or recruiting a new population from another region.

Dr. Roseann O'Reilly Runte is President and Vice-Chancellor of Carleton University. She is the author of numerous scholarly works in the fields of French and comparative literature. She has written extensively on economic and cultural development, higher education, and the importance of research. In addition, she is a creative writer and has received a prize in poetry from the Académie française. Dr. Runte has been awarded the Order of Canada and the French Order of Merit and is a Fellow of the Royal Society of Canada.

Which Gender Differences Matter for High-Tech Entrepreneurship?

J. McGrath Cohoon

“[The world’s greatest entrepreneurs] all seem to be white, male, nerds who’ve dropped out of Harvard or Stanford and they absolutely have no social life. So when I see that pattern coming in – which was true of Google – it was very easy to decide to invest.”

John Doerr

With data from successful founders of high-tech companies, we identify traits common to large majorities of them and any gender differences in those traits. There are few. Further, we identify criteria that might lead to gender imbalance among successful founders by comparing similarities and differences in the gender distribution of these traits among the general population and among successful founders. We find that signature traits of successful founders include: motivation by the desire to build wealth, and not by the inability to find traditional employment, nor because they developed a technology in a lab environment and wanted to see it make an impact; belief that startup success was due to prior industry or work experience, lessons learned from previous successes and failures, the company’s management team, and good fortune, not because of state or regional assistance or alumni networks; access to mentors, and little financial pressure for a steady income. None of these dominant traits appeared to be required unequally of men and women, although some traits were unequally distributed in the general population.

Introduction

Women are severely underrepresented in the high-tech world, and especially among high-tech entrepreneurs. For example, women comprised only about five percent of IT patent awardees in 2005, their highest share to that date (Ashcraft and Breitzman, 2007; <http://tinyurl.com/44q95nq>). This low rate of high-tech creation reflects on women’s low rate of high-tech *business* creation. Women comprise an estimated five or six percent of high-tech entrepreneurs (Robb and Coleman, 2009; <http://tinyurl.com/mvf3v5>), despite being 40 percent of all the self-employed people in the U.S. professional and technical ser-

vices industry in 2010 (U.S. Department of Labor; <http://tinyurl.com/3ww7oo7>).

The untapped potential of women’s creativity in the high-tech arena could be promoted if we understood the cultural stereotypes about gender, technology, and entrepreneurship that filter out people who do not fit the expected pattern or template. That template may or may not be legitimate, but it selects people with certain characteristics, and excludes others.

With data collected from 549 founders of successful high-growth, technology-based companies (hereafter referred to as “successful founders”),

Which Gender Differences Matter for Entrepreneurship?

J. McGrath Cohoon

Cohoon, Wadhwa, and Mitchell (2010; <http://tinyurl.com/28xkdfm>) compared the backgrounds, experiences, and motivations of men and women founders. Their results identified very few gender differences among these successful entrepreneurs. Successful founders had no significant gender differences in their levels of education, early interest in starting their own business, desire to build wealth or capitalize on a business idea, nor access to funding, and they largely agreed on the top issues and challenges facing entrepreneurs. They differed in how important they considered prior work or industry experience, although both groups considered it most important. The strong similarities and differences the data documented suggest a pattern for high-tech entrepreneurial success.

This pattern differs from what John Doerr described during his National Venture Capital Association interview in May 2008, when he characterized the most successful founders as: “white, male, nerds who’ve dropped out of Harvard or Stanford and they absolutely have no social life” (<http://tinyurl.com/3htqh5x>). Instead, it appears that other characteristics are at play in the selection of successful high-tech entrepreneurs, characteristics that might correlate with race and gender, but could still allow for more diversity among successful founders. We identify these dominant traits in this study.

In addition to identifying dominant or signature traits, we argue here that, based on principles of probability sampling, comparing the distribution of characteristics between successful men and women founders with those in the population of potential founders can help identify the pattern or filter that selects for successful founders. We consider the traits of interest based on the following logic, which is also illustrated in Table 1.

1. When the gender distribution of a dominant successful-founder characteristic (i.e., a characteristic shared by at least 75% of successful founders) matches that characteristic’s gender distribution in the population of potential entrepreneurs (i.e., the general population), this aspect of the selection process for becoming a successful founder is likely to be random. (Random selection processes typically result in representative samples, which are what we see in this case.)

2. When the gender distribution of a dominant successful-founder characteristic differs from its distribution in the population of potential entrepreneurs, the selection process for becoming a successful founder is not likely to be random. It is only these non-random dominant traits that interest us, because they imply a selection process that discriminates on the basis of gender or one that makes use of criteria correlated with gender in the general population.

When the selection process is not random because there is a gender difference on a dominant successful-founder trait that is equal in the general population, it identifies a gendered selection criterion. Dominant traits that are stronger among women than men founders suggest requirements put more on women than on men. The selection process likely requires that women in particular have this characteristic, whereas this trait is less necessary for men becoming successful founders. Correspondingly, traits that are comparatively weaker among successful women founders suggest requirements put more on men than on women.

When the selection process is not random because there is no gender difference on a dominant successful-founder trait that differs in the general population, it identifies a gendered selection criterion. This criterion is likely correlated with gender in the general population.

Which Gender Differences Matter for Entrepreneurship?

J. McGrath Cohoon

Table 1. Logical Analysis of Traits That May Contribute to Unequal Gender Composition of Successful Founders

In the General Population	Among Successful Founders	Implications for Women's Underrepresentation
No gender difference	No gender difference	The trait is not likely to make an important contribution to the gender composition of successful founders. The selection process is likely random.
No gender difference	Difference between men and women founders	The trait likely contributes to the gender imbalance among successful founders. The trait is required of one gender more than the other for being a successful founder. For example, when a trait is stronger among successful women founders than among successful men founders, this may lead to underrepresentation because this trait is less frequent in the general population of women, from which successful women founders arise. The selection process is likely not random.
Difference between men and women	No gender difference	The trait likely contributes to the gender imbalance among successful founders. This trait is deemed critical for successful founders, but for whatever reason, is not equally possessed by men and women. The selection process is likely not random.
Difference between men and women	Same gender difference as general population	The trait is not likely to make an important contribution to the gender composition of successful founders. The selection process is likely random.
Difference between men and women	Different gender difference than general population	The trait likely contributes to the gender imbalance among successful founders. As in the situation where there is no gender difference in the general population but one is observed among successful founders, here the trait is required of one gender more than the other for being a successful founder. The selection process is likely not random.

Which Gender Differences Matter for Entrepreneurship?

J. McGrath Cohoon

Dominant Traits of Successful High-Tech Entrepreneurs

As described by Cohoon and Aspray (2007; <http://tinyurl.com/3uky4lz>) in their review of literature on gender and entrepreneurship, only a very small amount of scholarly literature exists for the topic of gender and entrepreneurs in the high-tech sector. The literature that does exist considers mostly gender and entrepreneurship, but not specifically in the high-tech sector, and focuses on stereotypes, gender differences in personality traits, access to financial capital, social capital, and more recently, human capital.

Stereotypes

Traits associated with entrepreneurs in the United States are typically considered to be masculine traits. Comparing stereotyped entrepreneurial characteristics with characteristics considered masculine showed a strong correlation, but comparing them with feminine-stereotyped characteristics showed no correlation (Gupta et al, 2009; <http://tinyurl.com/3ox4hwh>). Further, that research found that both men and women who self-identified with masculine characteristics were more likely to intend entrepreneurial careers.

Similar results were obtained by Baron and colleagues (2001; <http://tinyurl.com/43slnjv>) when comparing stereotypically masculine traits of forcefulness, assertiveness, aggressiveness, confidence, and independence with stereotypes about entrepreneurs. They found that stereotypes about women entrepreneurs are more masculine than stereotypes about women in general. Women entrepreneurs were generally thought of as more decisive, more serious about their career, successful because of specific skills (in particular, social skills), and less feminine when compared with women managers.

In a sense, high-tech entrepreneurship is doubly masculine stereotyped. In addition to the mascu-

line stereotypes associated with entrepreneurship, high-tech interests, activities including academic study, and ability are all stereotyped as in the masculine domain (Wajcman, 1991; <http://tinyurl.com/6zp7x27>). So, our successful founders may be similar with respect to exhibiting traits thought of as masculine, but given the “masculine” label, men and women in the general population are likely to differ on these traits.

Personality Characteristics

Research on the actual traits of entrepreneurs has yielded less clear evidence than that on stereotypes. Comparing entrepreneurs with sales representatives showed that openness to experience, risk-taking propensity, and innovativeness were more often self-descriptions of entrepreneurs (Engle and Schmidt, 2011; <http://tinyurl.com/63kskos>). Findings from other studies vary.

The literature contains contradictions regarding whether risk-taking propensity is a characteristic entrepreneurs have in common and have more than other populations. Some studies found no difference in tendency toward risk-taking between women entrepreneurs and non-entrepreneurs (Sexton and Kent, 1981, as reported in Bowen and Hisrich, 1986: <http://tinyurl.com/6krmg24>). Other studies found that risk-taking distinguished between entrepreneurs and non-entrepreneurs, but not between men and women entrepreneurs (Carland and Carland, 1991; <http://tinyurl.com/3cawnju>). Finally, an Australian study of small business owners found that men and women entrepreneurs exhibited so-called masculine traits to the same degree, *except* in the case of risk-taking propensity, which was higher in men entrepreneurs (Watson and Newby, 2005; <http://tinyurl.com/3tqn5te>). Yet another study found that successful women entrepreneurs in the U.S. were less likely to take risks than their male peers (Sexton and Bowman-Upton, 1990; <http://tinyurl.com/3hqknuu>). Thus, even with the personality trait most often believed to distinguish between entrepreneurs

Which Gender Differences Matter for Entrepreneurship?

J. McGrath Cohoon

and non-entrepreneurs, the evidence is somewhat mixed. It appears that women entrepreneurs may have more risk-taking propensity than women in general, and perhaps less than men entrepreneurs.

Instead of personality characteristics, venture capitalists are more likely to identify experience as a key trait for entrepreneurial success. They considered human capital in the form of industry/domain/market experience and marketing experience to be more important than any personal characteristics (Black et al., 2010; <http://tinyurl.com/3pm85fj>).

Motivation and Early Interest

Motivation is necessary for people to engage in voluntary activities, so if men and women are motivated by different values or conditions related to entrepreneurship, this difference should affect whether they become successful founders. Some researchers suggest that gender differences in value systems may affect motivation and lead to women's underrepresentation among entrepreneurs. For example, Fagenson (1993; <http://tinyurl.com/3tsrrsj>) found only two significant differences between men and women after testing 30 variables measuring values: women more than men valued equality, while men more than women valued family security. Thus, if desires for equality or family security are common to entrepreneurs, these values could be part of the filtering process we are investigating.

Licht and Siegel (2005; <http://tinyurl.com/3dzp3cn>) report that the consensus of evidence finds entrepreneurial motivation is non-pecuniary and not due to unemployment. Instead, they summarize research findings as identifying autonomy as the leading motivation, with a secondary characteristic being underestimation of risk masquerading as risk-taking propensity.

Research often finds that teenaged girls express significantly less interest than boys in entrepren-

neurial careers (Wilson, Marlino, and Kickul, 2004; <http://tinyurl.com/3hzk9r3>; Kourilsky and Walsh, 1998; <http://tinyurl.com/3rfrvj7>). Nevertheless, this literature is small and generally lacks longitudinal data to compare adolescent attitudes and motivation with adult entrepreneurship. In addition, some recent studies found no gender difference in the early entrepreneurial intentions of business and economics students (Diaz-Garcia and Jimenez-Moreno, 2010; <http://tinyurl.com/3twkp6e>).

Access to Financial Capital

Access to financial capital contributes to successful entrepreneurship. Women entrepreneurs have less access to it, or make less use of financial capital, than do men entrepreneurs, however. This gender difference may stem from women's propensity to self-finance; the size, age, and industry of women's businesses; women's insufficient human or social capital; women's low participation in the best-funded industries; and perhaps, women's underrepresentation among funders. In any case, this gender difference has been observed among entrepreneurs, and so, seems a poor candidate for a selection criterion that filters women out.

Social Capital

Social capital is essentially one's network of useful social connections. These connections grant access to resources, including information, held by members of one's network. For example, social networks also can make the difference between locating and not locating funding, with success more likely when the entrepreneur's network intersects with the networks of one or more venture capital firms.

There is a wide literature on how entrepreneurs use social networks to obtain equity funding from venture capitalists: Elfring and Hulsink (2003; <http://tinyurl.com/3buks32>), Tyebjee and Bruno (1984; <http://tinyurl.com/3f365kd>),

Which Gender Differences Matter for Entrepreneurship?

J. McGrath Cohoon

Bygrave (1988; <http://tinyurl.com/3skrfqa>), Sargent and Young (1991; <http://tinyurl.com/3fg87lr>), Freear et al. (1992; <http://tinyurl.com/3lg8ahm>), and Fiet (1996; <http://tinyurl.com/6b4qjp6>). Other research also considers the influence industry context has on the usefulness of men's and women's social capital, implying for our study that women's networks in the high-tech arena would be less useful than men's networks (Loscocco et al., 2009; <http://tinyurl.com/5r8ln67>). Regardless, the evidence remains insufficient for drawing conclusions about the effect of social capital on women's underrepresentation among high-tech entrepreneurs. Gender differences in men and women's social networks are clear; it is their impact on successful founders that remains ambiguous.

Human Capital

The human capital of a business comprises the education, training, and work experience of its key workers. Educational elements of human capital have to do with both the amount and type of education, such as a liberal arts background versus a technical or business degree, and the level of education specifically focused on entrepreneurship. Work elements of human capital include experience in the same line of business, the amount of management experience the key individuals in the business have acquired, and their experience with startups.

Use of outside equity may be related to human capital. Evidence shows that graduate education increases the likelihood that women seek outside equity (Carter et al., 2003; <http://tinyurl.com/654gftm>). Other elements of human capital – financial acumen, startup experience, or managerial experience – had no measurable effect on seeking outside equity in that study. Regardless, these elements could affect entrepreneurship in other ways.

The issue of educational degree is particularly important for high-tech entrepreneurship, be-

cause women are less likely than men to have degrees in disciplines such as computer science or engineering. For Canadian Fortune 500 companies classified as “professional, scientific, and technical,” women held only 15% of senior officer positions in 2010, according to Catalyst (<http://tinyurl.com/3f758yq>). Likewise, data from Georgia show that women are under-represented as directors (11%) and executive officers (12%) in the state's Top 50 companies by revenue (Board of Directors Network, 2010; <http://tinyurl.com/3wwvw7o>). The same data also show that bioscience and non-technology companies are substantially more likely than technology companies to have at least one woman executive or board member (Technology Association of Georgia, 2011; <http://tinyurl.com/3tojlhg>). Without the preparatory experiences gained in such positions, potential women entrepreneurs are not likely to become successful founders.

In sum, the scholarly literature to date suggests that signature characteristics of entrepreneurship include:

- stereotypical masculine characteristics, perhaps including risk-taking propensity
- early motivation to be an entrepreneur
- access to financial capital
- useful professional networks
- human capital in the form of education and experience

Each of these characteristics, except perhaps access to financial capital, exhibit gender differences in the general population. Women are less likely than men to identify with stereotypically masculine traits. Women appear to be motivated by different values than men, on average, and may express less motivation than men to become entrepreneurs. It is also the case that wo-

Which Gender Differences Matter for Entrepreneurship?

J. McGrath Cohoon

men generally seem more risk-averse than men (Croson and Gneezy, 2004; <http://tinyurl.com/3swoxhp>). Women's social networks tend to be less utilitarian than men's. Women earn degrees in science, technology, and engineering at much lower rates than men and are less likely than men to have executive experience in high-tech.

Data and Methods

The data for the study reported here were collected by Wadhwa and colleagues in 2008-2009 from 549 respondents (<http://tinyurl.com/yhx4yyk>). (Five hundred and forty-two were eligible for the current analysis.) The response rate was about 40% of the founders from randomly selected high-tech companies who were invited to participate. In this study group, eight percent of the founders were women. This representation was on the high end of estimates for women entrepreneurs in the high-tech sector.

Respondents founded companies in the following industries that we consider high-tech: aerospace and defense; audio and video equipment; computer hardware, networks, peripherals, services, and storage devices; electronic instruments and controls; scientific and technical instruments; semiconductors; software and programming; biotechnology and drugs; health care facilities; medical equipment and supplies; computer services; engineering consultants; software and programming services.

The people included in this sample were all successful entrepreneurs, 59% of whom had founded two or more companies. The data made it possible to compare similarly positioned men and women entrepreneurs as few, if any, studies of entrepreneurs have done before. The survey participants were well matched in key respects. Because of the sampling methodology, they were in the same types of industries: more than half the respondents of each gender classified themselves as working in computing or some other highly technical field. The study subjects

also had founded their current companies at about the same age and at around the same time.

The primary data source for this study is a subset of an existing data set of corporate records included in the OneSource Information Services (<http://onesource.com>) company database. To construct the sampling frame, records were extracted for companies in selected industries. Company records were then stratified by geographic region and were selected randomly. Visits to the selected companies' web sites ensured that they were still in business and provided the names and contact information for founders. Founders (defined as very early employees, typically having joined the company before the products or business model were fully developed) were contacted by email as many as four times and were invited to complete an online survey. In some cases, email invitations were followed up with phone calls. For more information about the data and its collection, see Wadhwa et al., 2009: <http://tinyurl.com/yhx4yyk>.

Despite their relatively high representation in our sample, women still comprise only 41 of the 542 useable cases. This small number is not surprising given women's scarcity among high-tech entrepreneurs, but it could affect the generalizability of the results reported here. For the population of 1,373 founders identified as eligible participants for this study, with women's true representation between five and six percent of that population, the number of women eligible to participate in the study would be between 69 and 82. In order to meet the standard criterion of 95% certainty (plus or minus four points) that our results accurately represent the population, we needed responses from more women than we have in our sample – between 62 and 72 women. With the data we have, our confidence interval is between eight and nine points. This means that if there is less than a 16 or 18 point difference between the true percents of men's and women's responses, our analyses may fail to detect it.

Which Gender Differences Matter for Entrepreneurship?

J. McGrath Cohoon

Findings and Discussion

We tested a large number of respondents' reported characteristics and experiences for gender differences. These variables included: highest degree earned, interest while a college student in becoming an entrepreneur, family educational and entrepreneurial history, motivations for starting business(es), sources of funding, importance of various factors for startup success, challenges faced, and professional networks. Most of these variables showed no statistically significant gender differences. Nevertheless, it is important to recognize that differences could exist that our methodology was unable to uncover.

Strong majorities (75% or more) of our successful entrepreneurs exhibited the following traits:

1. They were motivated by the desire to build wealth (76%), contrary to longstanding views in the literature. They were not motivated by the inability to find traditional employment (5%), nor because they developed a technology in a lab environment and wanted to see it make an impact (23%).
2. They believed the success of their startup was due to their prior industry or work experience (96%), lessons learned from their previous successes (93%) and failures (87%), company's management team (86%), and good fortune (77%), not because of state or regional assistance (8%) or alumni networks (21%).
3. They found little challenge in either accessing mentors (83%) or in overcoming family or financial pressures to keep a traditional steady job (75%).

There were other similarities, but none that such a substantial portion of these successful founders shared.

Only one statistically significant gender difference was found among these dominant traits of

successful founders: family or financial pressure to keep a traditional steady job, which women reported far less than men (12% of women were challenged by this pressure, versus 27% of men). This trait is likely to reflect a gender difference also present in the general population, so it is not likely to be part of a biased selection process.

We discuss the results in more detail below. Overall, they suggest that criteria for successful founders are evenly applied to men and women, although gender inequities in the general population may affect who becomes a successful founder.

Motivations

Gender differences in motivations are commonly invoked for explaining gender segregation across occupations. In particular, women's concentration in low-paying, low-prestige occupations suggests that they are less motivated than men by desire for wealth. Beyond this observation and what appears to be a widespread assumption of a gender difference on pecuniary motivation, however, there appears to be little evidence for the general population. Without better evidence for a general gender difference in motivation by the desire for wealth, this defining characteristic of successful founders does not appear to filter women out. If instead, a gender difference in monetary motivation does exist in the population, then this criterion could filter women out because fewer of them than men possess this trait. The two non-motivations – unemployment and desire to see impact from one's invention – offer little explanation for gendered filtering.

Perceived Success Factors

Research often notes gender differences in attributions for success. Men are more likely than women to attribute their success to themselves and failures to external factors, whereas, women are more likely to attribute success to luck and

Which Gender Differences Matter for Entrepreneurship?

J. McGrath Cohoon

failure to their own shortcomings (Deaux and Farris, 1977; <http://tinyurl.com/68hagau>). With these gender differences in mind, it is somewhat surprising that our successful founders exhibit no measurable gender differences in this area. It appears that successful founders must recognize the value of learning from experience, assistance from colleagues, and luck, all of which fit well with stereotyped attributions to women. In this way, it seems that successful founders attribute success in much the same way women in the general population do. Therefore, these traits would not filter women out.

If instead, these factors reported as necessary for startup success are viewed as truly necessary for success, and not as only attributions, some of them may indeed disadvantage women. From this perspective, there is a gender difference in the population, with women less likely than men to have the necessary characteristics. Women's position in the educational system and workforce give them less opportunity than men to obtain the human capital that leads to founder success. They are less likely than men to study science, engineering, and technology, and less likely to hold high-level positions in high-tech industry. Therefore, equal application of these criteria for founder success would filter out women because of their relative lack of access to experiences deemed necessary for entrepreneurial success.

Resources and Pressures

Our findings indicate that successful founders have good access to mentors and advisors, and they have little pressure to keep a steady job. In general, women may have more need than men for mentors because standard social practice gives women less informal access than men to mentors. Given this observation of a population gender difference, but none among successful founders, it appears that access to mentors and advisors is a filtering characteristic. People can

only become entrepreneurs if they have adequate access to the mentoring so important for entrepreneurial success, but fewer women than men have social networks that include people who can mentor them on entrepreneurship.

Pressure to keep a steady job is a gender difference that disadvantages men in our society, but not successful founders, according to our study. This observation suggests that it is difficult to be a successful founder if one experiences this pressure. It acts as a filter, but one that would inhibit men more than women.

In sum, the necessity of becoming an entrepreneur because one desires wealth may contribute to filtering women out, but there is insufficient evidence to determine if this trait differs by gender in the general population. Human capital offers much more likely suspects for filtering traits. Because of their position in education and the workforce, women have less opportunity to acquire the backgrounds required of successful founders. Finally, the necessity of being mentored and the likelihood that women's networks will include people who can advise them may also act as a filter deterring women from becoming successful founders.

Implications for Gender Differences that Affect Successful Founders

We found that signature traits of successful founders include: motivation by the desire to build wealth, and not by the inability to find traditional employment, nor because they developed a technology in a lab environment and wanted to see it make an impact; belief that startup success was due to prior industry or work experience, lessons learned from previous successes and failures, the company's management team, and good fortune, not because of state or regional assistance or alumni networks; access to mentors, and little financial pressure for a steady income.

Which Gender Differences Matter for Entrepreneurship?

J. McGrath Cohoon

These findings corroborate reports in the literature in some cases, but contradict them in others. The largest contradiction comes from our finding that a strong majority of successful founders were motivated by pecuniary rewards. Both men and women were motivated by this factor, in contrast to a long history of theory and research that argues entrepreneurs are motivated primarily by non-pecuniary rewards. The difference in our findings might have to do either with the high-tech startup environment and recent popular stories of massive wealth accumulation, or perhaps with varying definitions for the population of study. Our population included only successful founders, not all new entrepreneurs, as some other studies include.

The two clearest points of agreement between our findings of successful founders' signature traits and those already in the literature are professional networks and human capital. Our study shows that successful founders themselves view their professional networks and prior experiences as playing substantial positive roles in their high-tech startup's success.

Comparing the gender distribution of dominant traits in the population and in our sample of successful founders showed that none of the traits appeared to be required unequally of men and women, although some traits were unequally distributed in the general population. In other words, the filter that impedes women from becoming successful high-tech entrepreneurs likely works through the unequal distribution of traits in the general population, not through discriminatory application of requirements for men and women founders.

Our findings should be taken as suggestive, rather than with a high degree of confidence that they accurately reflect conditions for women founders. The small number of women in our study limits our ability to make generalizable claims. Further, the filter we seek to describe could operate through combinations of traits, rather than the single traits we investigated.

Conclusion

With data collected by Wadhwa and colleagues (2009), traits common to a large majority of founders of successful high-tech companies were identified. These traits were then examined for significant gender differences among the founders and in the general population. When the gender distribution of a trait was similar in both groups, it was not likely to be a cause of women's underrepresentation among successful high-tech entrepreneurs. If instead, there was a difference in the gender distribution of a trait in the two groups, this trait could be filtering women out of entrepreneurship. We found that motivation by desire for wealth, importance of knowledge gained from experience, and access to social networks including mentors and advisors could all contribute to the gender imbalance among successful high-tech entrepreneurs.

*Joanne McGrath Cohoon holds positions as Associate Professor of Science, Technology, and Society at the University of Virginia and as Senior Research Scientist at the National Center for Women & IT (NCWIT; <http://ncwit.org>). Results from her research are reported in scholarly journals and an award-winning book from MIT Press, co-edited with William Aspray: *Women and Information Technology: Research on Underrepresentation* (<http://tinyurl.com/4yg9u5x>). At NCWIT, Cohoon researches and creates resources on high-tech startups, entrepreneurship, gender and education, technology, organizations, and inequality. She also serves on the board of the Computer Research Association's Committee on the Status of Women in Computing Research (CRA-W; <http://cra-w.org>), conducts interventions with high school teachers, trains and supervises professional consultants, and collaborates on increasing women's participation in volunteer computing.*

Building an Infrastructure to Support Women Founders: Lead to Win for Women

Janice Singer and Deborah Dexter

"The road to success is always under construction."

Attributed to Lily Tomlin

This article describes a new program, Lead to Win for Women (LTW-W), created in Canada's Capital Region to dramatically increase the number of women-founded businesses and to help existing businesses grow substantially. This new program is based on the existing Lead to Win program (<http://leadtowin.ca>). LTW-W has four program elements. First, there is a session to help women foster ideas to launch and grow businesses. Second, there is an expert speaker series that encourages the development of practical knowledge for businesses. Third, there is a forum for owners of established firms. Fourth, there is an outreach program for college women to encourage them to start businesses.

In this article, we briefly describe some existing programs to support women founders in Canada and abroad. Next, we outline the founding principles of LTW-W and describe the program in detail. Finally, we conclude with a description of the program's next steps.

Introduction

There is a respectable and growing body of research documenting the lack of women founders of businesses in growth sectors and, in particular, high-tech firms. In support of this research, as Industrial Technology Advisors (ITAs) with the National Research Council's Industrial Research Assistance Program (IRAP; <http://nrc-cnrc.gc.ca/eng/ibp/irap.html>), our role is to work with small and medium-size, growth-oriented businesses to provide advisory services, linkages, and project funding support for innovative R&D projects. Yet, women founders typically account for less than 5% of our caseload, and through an informal survey of our colleagues, this percentage seems to hold across IRAP overall. This imbalance disturbed us

both, and as such, we felt we needed to do something to address it. Thus, in conjunction with Dr. Tony Bailetti, the Director of Carleton University's Technology Innovation Management program (<http://carleton.ca/tim>) and founder of Lead to Win (LTW; <http://leadtowin.ca>), we created Lead to Win for Women (LTW-W). LTW-W builds upon the existing LTW program for talented individuals or teams that want to launch a new technology-based business in Canada's Capital Region. The goal of LTW-W is to encourage many more women in the region to start businesses and to help existing firms grow substantially.

This article describes LTW-W, focusing on the practical aspects of developing a program to support women entrepreneurs. First, we explore oth-

Lead to Win for Women

Janice Singer and Deborah Dexter

er programs whose mandate is to help women entrepreneurs. Second, we outline the founding principles guiding LTW-W. Third, we describe the key LTW-W features. Finally, we outline plans for our launch and next steps.

Existing Programs to Support Women Founders

Below is a brief sampling of programs that already exist to support women entrepreneurs in Canada and abroad. We briefly describe the programs and the support they provide. This list is by no means exhaustive, but rather provides a flavour of the types of programs that currently exist.

Programs in Canada

There are several women's enterprise centres located across Canada, including the Women's Enterprise Centre of Manitoba (<http://wecm.ca>), the Women's Enterprise Centre of British Columbia (<http://womensenterprise.ca>), Alberta Women Entrepreneurs (<http://awebusiness.com>), and the Paro Centre for Women's Enterprise in Northern Ontario (<http://paro.ca>). The mandate for each of these centres is to be the leading resource for women who are considering starting, purchasing, or growing a small business in their respective regions. Each of the centres provides women with access to knowledge, networking opportunities, and workshops to build business skills. The BC Women's Enterprise Centre and the Alberta Women Entrepreneurs additionally support women through access to working capital in the form of small business loans up to \$150,000.

Réseau des Femmes d'Affaires du Québec (RFAQ; <http://rfaq.ca>) is a 2000-member private organization that is based in Québec, where it operates chapters across the province. The chapters support and promote women in business through a variety of programs and services. Their membership, however, is not limited to

founders and includes entrepreneurs, business leaders, professionals, and self-employed workers across all economic sectors. They offer their members networking opportunities as well as personal and professional mentorship and coaching. They also maintain a database of women business leaders who would be suitable for positions on a board of directors.

The Women's Business Network (<http://www.womensbusinessnetwork.ca>) has chapters throughout Canada and is comprised of women who own their own businesses, whether they are professionals (e.g., lawyers and consultants) or own other types of businesses. The network provides opportunities for skills development and networking, and it provides a forum women can use to promote each other's businesses. The network also provides ancillary services, such as insurance.

The Women Presidents' Organization (<http://womenpresidentsorg.com/>) is a not-for-profit, but member-financed, organization located throughout Canada and the world. The mandate for the organization is to act as a peer advisory group for women presidents, addressing both strategic and operational issues. To be a member, a woman president's firm must have at least \$2 million in annual revenue (\$1 million for service-based businesses). WE-Connect Canada (<http://weconnectcanada.org>) is part of an international initiative that certifies women-controlled firms and connects them with corporations and governments that seek to diversify their supply chain. WE-Connect Canada also offers a variety of educational programs around bidding on large contracts. Finally, WE-Connect Canada also introduces women-controlled firms to procurement offices of large corporations and governments.

Additionally, in Canada there are programs run through universities. For instance, the mission of the Rotman Initiative for Women in Business

Lead to Win for Women

Janice Singer and Deborah Dexter

(<http://www.rotman.utoronto.ca/women>) is to help women develop the skills they need to become effective leaders. It does so through education, mentorship, and networking opportunities. As well, the program sponsors the Judy Project (http://ep.rotman.utoronto.ca/open/judy_project/), a leadership forum for executive women. The Centre for Women in Business (<http://msvu.ca/cwb>) is a similar program run out of Mount Saint Vincent University. It offers one-on-one advisory services, business projects with students, networking, and education events.

Programs in the United States

Women 2.0 (<http://women2.org>) is based in the Silicon Valley and has a vision to be the premier global source for women founders of innovative technology companies. Women 2.0 offers a variety of programs including an incubator program, networking events, a startup competition, a video series where founders share startup and growth advice, and an active blog showcasing national events and members.

Springboard Enterprises (<http://springboardenterprises.org>) focuses on being the catalyst to venture capital for women-led businesses. To date, they have helped 445 women-led enterprises raise more than \$5 billion and create over 10,000 jobs. The programs offered by Springboard include the Venture Forum, a six-month program that matches women entrepreneurs to experts who help them refine their pitch and access capital. Springboard also offers educational programs to teach women about the use of capital for growing their businesses. Finally, Springboard has an invitation-only, bi-annual caucus with advanced seminars and discussions for experienced entrepreneurs. There are also a number of regional programs, such as the Centre for Women and Enterprise (<http://cweonline.org>) in Boston. These regional programs provide very similar support to that provided by the Canadian programs highlighted earlier. There are also initiatives to support women from a particular eth-

nic background, such as the Asian Women Entrepreneurs (<http://aweoc.com>).

As a final note, in conducting this research, we found one venture fund that is focused on women-led enterprises: Fund Isabella (<http://fundisabella.com>). Although the fund is not currently accepting applications, it is worth noting that its mission is to provide intellectual and financial capital to help entrepreneurs build vibrant businesses, in turn earning the fund above-average returns on investment. They consider entrepreneurial ventures that have female leaders to be an “untapped market in the venture capital industry.”

Programs in Europe and Beyond

The European Union’s Women Entrepreneurship Portal (<http://tinyurl.com/44znpoj>) provides a useful directory of European organizations, networks, and projects whose mandate is to support women entrepreneurs. For instance, Prowess (<http://prowess.org.uk>) is a UK-based organization that offers similar services to those outlined above. In addition, they advocate for women’s entrepreneurship at the national and international levels.

Another range of programs support women founders for the purpose of elevating the status of women across a variety of countries. A good example is the Cherie Blair Foundation (<http://cherieblairfoundation.org>), whose mandate is focused on supporting female founders in Africa, Asia, and the Middle East. This foundation works with local partners in four key areas of support: business development, access to finance, technology, and network opportunities.

As a final note, Women Entrepreneurs GROW Global (<http://womenentrepreneursgrowglobal.org/>) is a blog that has a comprehensive listing of partners and resources that support the growth of women entrepreneurs.

Lead to Win for Women

Janice Singer and Deborah Dexter

In summary, both in Canada and internationally, there is a broad spectrum of support for women founders, both for founders of small businesses, and for those who are more oriented towards growth. In developing LTW-W, we investigated these different resources to inform the development of our guiding principles (described below), focusing on what we aimed to achieve in Canada's Capital Region.

Guiding Principles of LTW-W

When designing LTW-W, we were guided by five principles which are described below.

1. Growth. The primary audience for LTW-W is women founders who are oriented towards growth. We want to support women-owned firms whose goal is to grow regionally, provincially, nationally, and then internationally (not necessarily in that order). If a woman has zero employees, we want to help her to have one; if she has one employee, we want to help her to five; if she has five, we want to help her to 20, and so on. In focusing on growth, we are focusing on obtaining maximum economic value for our region, both in terms of future revenue and future employment. LTW-W is sector neutral; as long as the founders are focused on growth, we will support them in achieving their goals.

2. Staging. LTW-W supports women-founded firms across the spectrum of current revenue and number of employees, meaning that many of our members have zero employees, while others may have twenty. As such, in order to obtain maximum value for our members, we offer a variety of services depending on the maturity of their firm and the extent of their entrepreneurial experience. This is because the problems that firms face when they are in a start-up mode are significantly different than the problems faced by established firms on a growth trajectory. Because of this, we have created phases for the LTW-W program (described in more detail be-

low). Networking and other opportunities are then defined by these stages.

3. Trust. LTW-W supports women *founders*. Because of this, we are being selective in terms of the women that we invite to participate in the program, so that events are driven and attended by founders and are not overtaken with the myriad professionals who support them (e.g., lawyers, marketers, government personnel). This is not to say that we do not value those allied professionals, but we strive to create an environment where the women trust each other because they are trying to achieve similar goals and are alike in their founder status. In this way, we are striving to create an exclusive club that breeds trust amongst its participants.

4. Self-direction. The goal of LTW-W is to support women founders, not direct them as to what would be most beneficial. As such, we have sought feedback directly from women entrepreneurs at all levels to design our programs. Based on our experience, we offer some specific elements that we feel are appropriate even though women would not necessarily think to suggest them. However, the program is designed largely based on feedback from the women founders. As well, the program will adapt and evolve according to the program's successes and the evolving needs of its participants. We will drop those elements that do not work and build upon those that do, trying new things as the women suggest them. We want to build a self-sustaining community, and we believe the way to do so is to involve women founders in the organization and leadership of the community.

5. Practicality. LTW-W provides advice and support that is practical and actionable. While we recognize the importance of personal and leadership development, LTW-W does not offer opportunities in this area. Our lecture series and other events are focused on skills and knowledge sets, such as protecting intellectual property,

Lead to Win for Women

Janice Singer and Deborah Dexter

reading a financial statement, making an excellent pitch, understanding a term sheet, or simply creating an appropriate employment contract. Our goal is to provide women founders with basic business skills, which will provide the framework for them to recognize where they need to develop further and where they may need to bring in allied experts.

Building on Lead to Win

LTW-W is based on the LTW program, which was first held in 2002 in response to the economic downturn in Canada's Capital Region, and it was re-launched in 2009. Its goal was to generate high economic value by creating a world-class ecosystem to spawn high-tech companies. In Phase I of the LTW program, individuals or teams apply to participate. If they are accepted into the program, participants undertake an intensive six-day development program (Phase II), which helps them harden and strengthen their business opportunities. If they can demonstrate that their opportunities are sufficiently developed, participants graduate into Phase III, in which they are connected to a business ecosystem that helps them launch and grow their technology businesses. For further details, see the article by Bailetti and Hudson in the December 2009 issue of the OSBR (<http://tinyurl.com/26glytb>). For LTW-W, we are following the same basic format as LTW, with the intent to offer regular sessions of the program. Our sessions will have two critical distinctions:

1. Greater representation by women. LTW-W is designed to help women entrepreneurs, but the program is not exclusive to women. Through the acceptance process, we will ensure that at least 50% of participants will be women who are founders or hold equity in their opportunity. The reason we will accept male founders is based on the results of a survey we conducted with potential women applicants. Overall, our potential applicants desired a greater representation of

women in LTW-W, not an exclusion of men. They saw men as valuable partners and sources for feedback. Moreover, women frequently create companies with men, thus the firm, and not just the individual, is the beneficiary of our services.

2. A focus on growth, not technology. The second critical difference between LTW and LTW-W is that LTW-W allows women founders from any sector to apply as long as they are focused on growth. We do so because we are looking to build a critical mass of women founders to get the program off the ground. As our membership and members' firms grow, we anticipate that innovation will also be a required characteristic of the firms we support, in that innovation leads to growth.

Program Details

During the application process for LTW-W, qualified applicants will be invited to meet with a recruiting committee. Based on the founder's experience, commitment, motivation, and the ecosystem's capability to add value to the founder, applicants will be invited to participate in Phase II. In Phase II, founders will participate in an intense six-day program where they harden and strengthen their opportunities. The first three days of Phase II emphasize the development and clear articulation of customer and partner (ecosystem) value propositions. The second three days of Phase II focus on other aspects of entrepreneurship including financing, legal considerations, and attracting talent. External reviewers examine the opportunities on Day 3 and Day 6. Day 3 reviewers assess whether or not proponents of a business opportunity can: i) clearly articulate their customer and value propositions and the key differentiators for which customers are willing to pay and ii) are ready for Days 4-6. Day 6 reviewers assess the strength of the business opportunity and participant's readiness for Phase III.

Lead to Win for Women

Janice Singer and Deborah Dexter

If a founder has passed both gates for Phase II, they are invited to join Phase III, where a variety of incubation services are provided to participants to launch and grow their business. In Phase III, the founders have become part of the LTW-W ecosystem, which will be bridged to the LTW ecosystem that already exists. Each startup in the ecosystem: i) is expected to create a minimum of six jobs in Canada's Capital Region; ii) can utilize the keystone's infrastructure to co-create value with its customers, partners, and other organizations; and iii) has access to a variety of services designed to help companies grow. Phase IV will also be open to women who have already established firms and are looking for support to help their firms grow, even if they have not participated in the previous three phases.

Participants will also benefit from an expert speaker series, which is an opportunity for women to gain insight into the practical skills relevant to running a business, whether they are in the start-up phase or are running established enterprises. Each month, a speaker will be invited to talk on a topic of interest, for instance, protecting intellectual property, reading a financial statement, managing operations, or generating leads. The talk is meant to provide women founders with an overview of the topic. The overview allows the women founders to determine whether it is necessary to gain additional knowledge, or whether they need to bring in an allied professional to help them develop a plan or strategy, or potentially hire extra expertise in a particular area. The expert speaker series also provides women an opportunity to network in an informal setting.

Because the requirements of founders of established firms are significantly different than those of startups, we are exploring various formats to serve their needs with the ultimate goal of accelerating the growth of their firms. Based on feedback from our members, we believe that it is

necessary to hold regular (but not too frequent) meetings of established founders of firms with more than five employees, whether they have participated in the six-day sessions or not. In these meetings, it is necessary to create a climate of trust, so that the founders create a network of real value. One idea we have been exploring is to hold a forum where the founders can act to solve each others' problems through coaching based on mutual experience. We believe this element of LTW-W is as important as the creation of firms. Many women-run businesses are not able to achieve the ultimate growth targets that are possible – either because the founders do not have the necessary skills or because they are simply unaware of the possibilities.

Finally, we intend to establish an outreach program for college women to encourage them to start businesses.

Conclusion

This article described the LTW-W program, which we developed in conjunction with Dr. Tony Bailetti, founder of the original LTW program. LTW-W was created because we observed a fundamental lack of women founders in our IRAP caseloads, and more generally speaking, because women are not represented adequately as founders in high-growth sectors, including high-technology. This lack of women founders was reflected in the original LTW program as well. The goal of LTW-W is to substantially increase the number of businesses owned and launched by women and to grow the revenues of established women-led firms. Our next steps include a formal launch, an analysis of additional services that may be necessary, and the development of metrics to measure our program.

LTW-W was informally launched in May with our first expert speaker series on intellectual property rights. In the fall of 2011, we will formally launch the LTW-W program as well as an es-

Lead to Win for Women

Janice Singer and Deborah Dexter

established founder program. Our goal is to create the infrastructure necessary so that the program, if successful, can be replicated elsewhere. As well, we aim to create an organizational structure that is ultimately self-sustaining. In order to do so, we need to create an ecosystem that adds value to businesses. We plan to evolve our offerings as necessary to continue to attain that goal. In the short term, we will launch, evaluate, and refine. There is an abundant amount of excitement in Canada's Capital Region for LTW-W, and we are learning to harness it to get the program off the ground.

Financial assistance for LTW-W is being provided by the National Research Council's Industrial Research Assistance Program (IRAP; <http://nrc-cnrc.gc.ca/eng/irap/irap.html>). IRAP is Canada's premier innovation system for small and medium-sized enterprises (SMEs).

Janice Singer is an Industrial Technology Advisor (ITA) for the National Research Council of Canada Industrial Research Assistance Program (IRAP) in Ottawa. Prior to becoming an ITA, Janice was a software engineering researcher with the Institute for Information Technology of the National Research Council of Canada (NRC). Janice's research focused on improving productivity for software engineering teams and user experience. During her research tenure, Janice collaborated with multiple industrial and university partners including IBM, Microsoft, Mitel, Nortel, Bell Canada, and several local SMEs. She is an adjunct professor with both the University of Victoria School of Computer Science and University of Ottawa School of Information Technology and Engineering. Janice holds a B.Sc. in Cognitive Science from University of California, San Diego, and a Ph.D. in Cognitive Psychology from the University of Pittsburgh. Before the NRC, she held positions at Tektronix, Xerox PARC, and IBM.

Deborah Dexter is an Industrial Technology Advisor (ITA) for the National Research Council of Canada Industrial Research Assistance Program (IRAP) in Gatineau, Québec since January 2010. Prior to that, Deborah worked in the private sector and has over 20 years of experience in the software tools and systems business in the aerospace and defense, security, and telecommunications markets. Her experience in these areas is extensive, and she has worked for and consulted to a wide range of product and systems companies, both small and large. She has expertise in technical sales, business development, marketing, and business planning activities. She has a technical background, with a BMath in Computer Science from the University of Waterloo in Canada. She also holds a Minor degree in French and is very comfortable working in both of Canada's official languages.

Q&A

Ruth Bastedo

Q. Why Is There a Dearth of Women on High-Growth Technology Startup Teams?

A. I have been working with women entrepreneurs in Canada since 2001, when I sold my shares in a dot-com company I started with work colleagues. We were a team comprised of men and women, each with an equal share of the company. I had an epiphany that year, and realized that women could make a lot of money from being part of such a startup team. The technology field was stimulating and exciting. I would say about 90% of the programmers in our 50-person company were male, and mostly from Waterloo. About half the project managers and creative talent were female.

Truth be told, it was a male partner that primarily drove the growth and arranged the meetings with potential investors and to his credit, played a lot of hockey and golf that sealed our first deals. I brought in a lot of business and did a substantial amount to support client acquisition, create good products, develop our growth strategy, and build overall client satisfaction, but when I look at our amazing growth trajectory from a ten-year vantage point, I am not certain I would have had the same success on my own. It was a team effort.

Our business was valued at \$10 million and we sold it just before the market crashed. Most of the money went back into the company. The publicly traded company that bought us went into bankruptcy shortly afterwards, and my dot-com adventure came to a close.

All of the founders took some time to process the experience. We had stiff non-competition agreements and each of us had to decide where to go next. I had had two children within a short peri-

od of time, and by the time I sold my last share, I was nursing a newborn and chasing around a toddler with the help of an excellent caregiver and involved husband. Even with this help, I realized that the challenges of continuing the entrepreneurship lifestyle with the same intensity as before were going to be substantial.

I became fascinated with the question of how women can raise children and put in the long hours required by technology startups. How were negotiating teams supposed to count vesting periods in deals with pregnant women? Clearly, none of the lawyers negotiating my deal had encountered that situation before. How were women supposed to connect with the venture capital community, when so many of the deals are done over a friendly game of golf or belt of scotch? And lastly, the startup culture in the technology sector is, not surprisingly, driven by technologists, very few of whom are women.

I have devoted a lot of time to supporting, studying, and engaging with women entrepreneurs from a wide variety of sectors, most of which are service oriented. I have led associations, participated in government consultations, and represented Canada internationally at symposia of women entrepreneurs. Over the last couple of years, I have been working with the Rotman School of Management (<http://rotman.utoronto.ca>) to create Next Steps, a program for high-growth women entrepreneurs. With the emergence of social media as a “hot” startup area – and one that arguably plays to women’s strengths – I have started to look at women-led startups in the technology space again.

Q&A: Why is There a Dearth of Women on Startup Teams?

Ruth Bastedo

Through my work with women-led startups, I have come to the following conclusion: as an industry, we should be focusing on increasing the number of women on startup teams. We should be ensuring that women team members have an equity stake in the business and have meaningful leadership roles on the management teams. If a woman is President and CEO, that is wonderful, but I feel that it is even more important just to have women present and engaged. I believe that the diversity in viewpoint and life experience that women leaders bring to the table impact the performance of companies in a complex, global, and increasingly interconnected world. This is the world in which Canadian startups have to compete and thrive in order to boost our country's productivity levels. Women have to have a seat at the table, and by being there, have the potential to impact the success of Canadian startups.

A recent Catalyst study showed that companies with three or more women on their board of directors outperform those with fewer women by 53% on return on equity, 42% on return on sales, and 66% of return on invested capital (Joy et al., 2007; <http://tinyurl.com/y9y5dg4>). Moreover, the study found that the link between women board directors and corporate performance holds across industries. I am convinced that part of the reason for our startup's success, was that, at all times, there was that strong female representation in the founding leadership team (with a female COO and VP Creative) that impacted all parts of the company, ranging from product and service development, client service, human resources, operations, and business development. Our "secret sauce" was the diversity in our leadership team.

If diverse startup teams can be so successful, why are they so rare? Among other factors, the following reasons contribute to the rarity of women on startup teams:

1. There are few women who have a background in technology. Women looking to work with a technology startup are more likely to have a background in sales, project management, marketing, legal issues, or human resources. Even in my case, when I did my new media training at the Vancouver Film School in 1995, there were four women in my class of about 25. To make matters worse, the numbers of women enrolling in computer science at universities is actually dwindling, as will be discussed later.

2. There are very few venture capitalists and investors who are women. Women who are investors are at least likely to connect with women on startup teams. In the United States, investment firms with at least one woman partner are 70% more likely to invest in a women entrepreneur than firms that have only male partners, according to a whitepaper published by the venture capitalist firm Illuminate Ventures (<http://www.illuminate.com/whitepaper/>).

3. There is no incentive for change. Having young women in key leadership roles is challenging. My partners were not thrilled that I took two maternity leaves, albeit short ones, within two years. People in general are very comfortable with the status quo, and the technology community has a comfortable homogeneity when it comes to the model for success. But as one recent columnist, Natasha Mooney, said, "Hiring your first woman employee when you're a 30-person company is far more difficult than when you're a 5-person company." (<http://tinyurl.com/3hq6w3a>)

So, what is stopping women from taking major leadership roles in the technology startups of today? Through my work in the field of women entrepreneurs, I have identified five recommendations to increase the number of women in startup teams:

Q&A: Why is There a Dearth of Women on Startup Teams?

Ruth Bastedo

1. Encourage startup teams to consciously analyze the diversity in their leadership teams.

What diversity of thought could be missing as part of the growth strategy? Ask founders what might be missing in the mix, from product development to sales strategy to growth strategy? For example, with consumer-oriented products, how is the team addressing the needs of a female user base? Groupon's subscription base is over 75% female (<http://tinyurl.com/3e7q9gm>). This is not the type of number to dismiss lightly. At times, the female viewpoint needs to be represented at senior levels in the organization, even if that female viewpoint is that of the end consumer.

2. Tap into a base of experienced, older women leaders.

Women business leaders in their 40s, 50s, and 60s are excellent sources of experienced management talent for startups. Tapping into this group and engaging them in technology startups as investors or members of a management team or advisory board can be an excellent way to tap into the experience and expertise of these women. This is the view of private equity expert Jacoline Loewen, Director at Loewen and Partners in Toronto and panelist on the Business News Network television show *The Pitch*. She says, "Startups are like an intense marriage and choosing a woman 50+ to be a founding member, particularly if you are all males under 30, could be a savvy choice... these guys have to get over the stereotype of mum with the cookie tray nagging about a messy room. At age 53, Arianna Huffington did a startup bloggers' forum website called The Huffington Post which went on to get sold 6 years later to AOL for US\$315 million."

3. Acknowledge that women may have different needs than their male counterparts.

In their early 20s, women can compete more or less head to head with men. Unfortunately, many women soon find that their careers are impacted by the decision to have a family. What they need during this period is as much flexibility as possible. They also need to earn enough money to

have good quality childcare so that they can present to that potential investor in New York on the spur of the moment. This need for cash flow during this critical period is important to understand.

4. Support and nurture organizations that in turn support women entrepreneurs.

There are several organizations and initiatives in Canada, and increasingly internationally, that support women who want to engage and be successful in high-growth startups. The support for these organizations needs to come from multiple sectors: government, professional services, technology, financial services, and academia. In order to increase the likelihood of success, women need the contacts, networks, mentorship, and access to information that these initiatives can provide. Compelling examples of these types of initiative in Canada include:

- Canadian Women in Technology (<http://catawit.ca>)
- Rotman's Next Steps (<http://www.rotman.utoronto.ca/women/>)
- WEConnect (<http://weconnectcanada.org>)
- Women's President's Organization (<http://womenpresidentsorg.com>)

Further examples from the United States include:

- National Association of Women Business Owners (<http://nawbo.org>)
- Astia (<http://astia.org>)
- National Center for Women & Information Technology's Entrepreneurial Alliance program, designed to integrate women into startup teams of under 100 employees (http://www.ncwit.org/ea_home.php)

Q&A: Why is There a Dearth of Women on Startup Teams?

Ruth Bastedo

5. Expose technology and computer science to girls in a more compelling way. Girls and young women love using technology, as any parent with any exposure to girls and their Webkinz can attest to, but how can this early enthusiasm and interest be translated into an interest in product and software design? How can we teach girls to engage in programming in a more appealing way? There are those that are trying, but the representation of women in computer science departments continues to decline. From 2002 through 2009, the proportion of female graduates from computer science bachelor degree programs declined from 19.4% to 11.3% in Canada and the United States (Zweben, 2009; <http://tinyurl.com/3v8zf3j>).

Initiatives such as Alice (<http://www.alice.org>), educational software that teaches students computer programming in a 3D environment at Carnegie Mellon, show a model of how to engage girls in middle school. Alice allows students to learn fundamental concepts of programming and programming logic without a background in mathematics and programming. The software introduces a storytelling model, which allows girls to create software that is personally relevant to them. (For further details on the promise of the Alice approach for influencing later success in computer science education, see the paper by the National Center for Women & Information Technology: <http://tinyurl.com/4yl2za9>) Going through the process of learning how to program is very important in the technology industry, not only as a potential pathway to becoming a programmer, but also as important background to enable more effective interactions with technical teams. This early engagement in technology is a

critical step in getting women to the point where, in their 20s, they might find themselves in an environment conducive to creating the next “killer app”.

From my vantage point, following these recommendations would help infuse our existing startup teams with female talent and nurture the younger generation of women that is interested in using technology to create products and services that are consumer friendly. Encouraging more women to be a part of high-growth technology startup teams, as entrepreneurs or otherwise, will result in well-balanced technology companies that can compete effectively in today’s diverse world.

Ruth Bastedo is President of Experience Media Group Inc., a digital learning and communications firm based in Toronto, Canada. A serial entrepreneur, Ruth has produced award-winning, web-based communications products for over 13 years in Canada, the US, and the UK. As co-founder of Medium One, Ruth sold her first business during the dot-com era in 2001, and she has been a passionate proponent of entrepreneurship for women ever since. She is the Past-President of Women Entrepreneurs of Canada (WEC) and participated in consultations with International Trade Canada, Status of Women Canada, and Industry Canada. She has participated in trade missions and represented Canada at several international events for women entrepreneurs. Ruth is currently co-designer and program consultant for the Rotman School of Management’s Next Steps program for experienced women entrepreneurs.

Q&A

Cate Huston

Q. *Should All Women Aspire to Be Entrepreneurs?*

A. The word “entrepreneur” comes from the French word *entreprendre*, meaning “to undertake”. While all women should aspire to be someone who “undertakes”, they should not all aspire to be someone who creates and runs a company. Not every woman’s skills, interests, and ambitions are well suited to this task.

Many authors, in this issue of the OSBR and elsewhere, highlight the relative lack of women entrepreneurs and suggest ways that we can overcome the challenges women face so that we can increase the numbers. However, I wish to offer another perspective. I do not want to be an entrepreneur and I am not the only woman who feels this way. Here, I wish to highlight the importance filling gaps as a form of leadership. This alternative to entrepreneurship is valuable and is also in need of encouragement.

Why I Am Not an Entrepreneur

People often tell me that I would make a good entrepreneur. They also imply that I should want to be one, and yet I do not. While I retain the freedom to change my mind in the future, I am choosing an alternate route. In part, I am choosing not to be an entrepreneur because I do not have a burning idea that I want to pursue, or at least I find that I have freedom to pursue and express my ideas in my current role. Mostly, I choose not to be an entrepreneur because I prefer to focus on my strengths and interests. I enjoy writing code, learning from my colleagues, and hopefully creating something that a large number of people will find useful. I enjoy not having to write business plans, think about cashflow, deal with HR issues, or worry

about how to monetize a product. I do have a growth mindset and believe I could rise to the challenges that entrepreneurship would bring, but I do not believe I would enjoy it as much as what I am doing now.

I am fortunate because I have an abundance of choices. Thanks to my European passport, there are many places where I am welcome to live. My degree in computer science gives me a number of options for employment, not just as a software engineer. I currently work at Google, where I enjoy a choice of projects to work on and where I know I can make an impact. I was recently frustrated, having spent three days perfecting something that seemed small and trivial, when a colleague reminded me to think of the number of people who will use it; this changed my perspective. It reminded me that impact is not always proportional to the “impressiveness” of a project. It is important to recognize different types of impact and different forms of leadership.

Overt Leadership

The form of leadership celebrated in the media is the single superhero, the visionary, the larger-than-life figure with great ambition and an ego to match. However, Jim Collins, in *Good to Great* (<http://tinyurl.com/42xke7z>), found that this form of leadership did not create an enduringly great company, in terms of sustained growth over a 15-year period. The defining characteristic of a good-to-great CEO was “level 5 leadership”. A level 5 leader is someone who “blends extreme personal humility with intense professional will”. By contrast, in over two-thirds of

Q&A: Should All Women Aspire to Be Entrepreneurs?

Cate Huston

comparison cases – particularly those with a short period of growth followed by decline – a gargantuan personal ego was found to contribute to the demise or continued mediocrity of a company. Collins asserts that, while a lesser leader will look in the mirror to apportion credit, and out the window to apportion blame, a level 5 leader looks in the mirror to apportion blame, and out the window to apportion credit. Of course, this is just one attribute of level 5 leadership, but women in engineering have been found more likely than men to attribute success to hard work or outside help but tend to attribute failure to their own lack of ability. Men were found more likely to attribute success to their own ability, while attributing failures to a lack of effort or unfair treatment (Felder et al., 1995; <http://tinyurl.com/6cb4nqf>).

Robin Sharma (in *The Leader Who Had No Title*; <http://tinyurl.com/62rnyv7>) and the Arbinger Institute (in *Leadership and Self Deception*; <http://tinyurl.com/6hk1p62>) reinforce the importance of bottom-up, rather than top-down, leadership. This quieter form of leadership does not require permission from anyone else, only from oneself. In fact, that is the whole point of it. If a person – anywhere and in any position – starts behaving differently, it will affect those around them.

Leadership in the Gaps

The examples above illustrate that quieter forms of leadership are desirable and they challenge us to reconsider our celebration of overt leadership. Many leaders may be overlooked because they are not seeking a title or fame, but desire and work towards change. They are not seeking to influence others, yet do so by their actions. I call this quieter form of leadership “leadership in the gaps”. Leadership in the gaps often takes the form of ownership of problems that others have missed, sometimes in ways that are small but have great impact. Examples include owning a feature on a product, or making sure that a

new person on a project received the support they need to quickly become productive. Women seem to be more willing to take on tasks that do not have as much recognition. Of course, lack of recognition of this kind of contribution is career-limiting, and a recognized problem for minority academics is limiting the number of committees they are on in order to retain time for research. Ultimately, I do think that women need to step forward and take on bigger roles, more than gap-filling, but gap-filling leadership is under-recognized for its utility, and also a helpful stepping stone towards the spotlight.

Often, gaps are larger than they seem. Sarah Blow grew tired of being the only woman at technical events. She saw a gap and filled it with Girl Geek Dinners (<http://girlgeekdinners.com>), which hosts regular dinner events with talks on technical subjects or topics of particular relevance to women. From its first event in London, England in 2005, the idea has now spread across 30 countries. This one woman identified a local gap and filled it, but she also led others by revealing similar gaps that others could fill. I helped fill one of these gaps by bringing Girl Geek Dinners to Kitchener-Waterloo. Similarly, I helped bring the Awesome Foundation to Ottawa with Awesome Ottawa (<http://awesomeottawa.ca>), and Awesome Foundation KW (<http://kwawesome.com>). The Awesome Foundation provides a series of monthly \$1,000 grants to projects and their creators. I also helped resurrect the University of Ottawa’s chapter of the Women in Science and Engineering organization (<http://wise-ottawa.ca>) because I felt strongly that it could fill an important gap for female scientists and engineers. I do not mention these projects in order to celebrate my own achievements, and of course many other people contributed to the success of each of them, but rather I wish to point out the similarities between leadership in the gaps and entrepreneurship. Observing a gap that you are passionate to fill is similar to coming up with that burning idea that will become a company. It is crucial to be able to

Q&A: Should All Women Aspire to Be Entrepreneurs?

Cate Huston

articulate why a project is important, in order to connect with fellow gap-fillers and obtain funding.

Further examples of leadership in the gaps are all around us, and the people who find and fill these gaps often do not even see themselves as leaders. Leadership in the gaps might be just a small stepping-stone on the way to more overt forms of leadership or even entrepreneurship. Perhaps this is why we do not always notice leadership in the gaps, because it looks small and easy. But it is never really that easy to find time in an already-busy life to fight against inertia and face the criticism of those who do not act, other than to make their opinions heard. Seeing something that should happen and then making it a reality is rarer than it should be. We need to encourage women to recognize that leadership in the gaps is valued and encourage them to take action to prove it.

Conclusion

Some women aspire to be entrepreneurs and we should do all we can to help them be successful. However, we should also recognize that some women do not aspire to be entrepreneurs and we need to encourage them to be leaders as well. They should be encouraged to undertake leadership actions in a way that will make an impact

and fulfill their passions, whether that is by being an entrepreneur, a politician, a CTO, a social innovator, or through other forms of leadership in the gaps. Above all we should recognize that leadership is a quality that is needed everywhere, and we should encourage those who demonstrate it, wherever and however they do so. We need the people who stand up to be entrepreneurs and visionaries, but we also need the people who observe the gaps in their communities and fill them. Women may make up disproportionately few of the former, but I suspect they make up disproportionately more of the latter, and if we recognized, encouraged, and celebrated leadership in the gaps, who knows what bigger gaps such people might find and fill.

Cate Huston is a Software Engineer at Google. She has a BSc (Hons) in Computer Science from the University of Edinburgh and used to be an international hobo, teaching programming in the United States and in Shanghai, training in martial arts in China, qualifying as a ski instructor in Canada, and aimlessly wandering around Europe. For now, she lives in Kitchener/Waterloo, Canada. She was the Instigator of Awesome at Awesome Ottawa, is a co-conspirator for Awesome Foundation KW, and is an organizer of Girl Geek Dinners KW. Her blog is Accidentally in Code (<http://accidentallyincode.com>).

Eclipse Foundation:

The Open Source Developer Report: 2011 Eclipse Community Survey

From the Executive Summary:

"Eclipse is a large, vibrant, well-established open source community with over 200 open source projects, close to 1,000 committers, 170-plus member companies, thousands of companies embedding Eclipse into products and applications, and million of users. Eclipse began as a Java IDE but has evolved into a much larger and more diverse open source community. Eclipse has become a major destination for people involved in developing software that includes open source software.

In April 2011, the Eclipse Foundation undertook a survey of the Eclipse community to better understand how people are using Eclipse, using other open source software (OSS), and participating in open source communities. The purpose was to create a profile of how open source developers interact with the community."

http://www.eclipse.org/org/community_survey/Eclipse_Survey_2011_Report.pdf

U.S. Government:

Open Technology Development: Lessons Learned and Best Practices for Military Software

From the Introduction:

"The purpose of this document is to help U.S. government personnel and contractors implement open technology development (OTD) for software within government projects, particularly in defense. OTD is an approach to software/system development in which developers in different military, federal, commercial and possibly public organizations can collaboratively develop and maintain software or a system in a decentralized fashion. OTD depends on open standards and interfaces, open source software and designs, collaborative and distributed online tools, and technological agility."

<http://www.oss-institute.org/OTD2011/OTD-lessons-learned-military-FinalV1.pdf>

Carleton Entrepreneurs

Carleton Entrepreneurs will provide you with experienced mentors and reviewers to help transform your idea into a compelling opportunity and on to a successful venture.



Information sessions

visit www.carleton.ca/ventures

Transforming ideas into ventures



Carleton
UNIVERSITY



Technology Innovation Management (TIM)

Unique Master's program for innovative engineers
Apply at www.carleton.ca/tim



TIM is a unique Master's program for innovative engineers that focuses on creating wealth at the early stages of company or opportunity life cycles. It is offered by Carleton University's Department of Systems and Computer Engineering. The program provides benefits to aspiring entrepreneurs, engineers seeking more senior leadership roles in their companies, and engineers building credentials and expertise for their next career move.



Carleton
UNIVERSITY

Contribute

The goal of the Open Source Business Resource is to provide quality and insightful content regarding the issues relevant to the development and commercialization of open source assets. We believe the best way to achieve this goal is through the contributions and feedback from experts within the business and open source communities.

OSBR readers are looking for practical ideas they can apply within their own organizations. They also appreciate a thorough exploration of the issues and emerging trends surrounding the business of open source. If you are considering contributing an article, start by asking yourself:

1. Does my research or experience provide any new insights or perspectives?
2. Do I often find myself having to explain this topic when I meet people as they are unaware of its relevance?
3. Do I believe that I could have saved myself time, money, and frustration if someone had explained to me the issues surrounding this topic?
4. Am I constantly correcting misconceptions regarding this topic?
5. Am I considered to be an expert in this field? For example, do I present my research or experience at conferences?

If your answer to any of these questions is "yes," then your topic is probably of interest to OSBR readers.

When writing your article, keep the following points in mind:

1. Thoroughly examine the topic; don't leave the reader wishing for more.
2. Know your central theme and stick to it.
3. Demonstrate your depth of understanding for the topic, and that you have considered its benefits, possible outcomes, and applicability.
4. Write in third-person formal style. Formal first-person style (we only) may also be acceptable.

These guidelines should assist in the process of translating your expertise into a focused article which adds to the knowledgeable resources available through the OSBR.

Formatting Guidelines:

Indicate if your submission has been previously published elsewhere.

Do not send articles shorter than 1500 words or longer than 3000 words.

Begin with a thought-provoking quotation that matches the spirit of the article. Research the source of your quotation in order to provide proper attribution.

Include a 2-3 paragraph abstract that provides the key messages you will be presenting in the article.

Any quotations or references within the article text need attribution. The URL to an online reference is preferred; where no online reference exists, include the name of the person and the full title of the article or book containing the referenced text. If the reference is from a personal communication, ensure that you have permission to use the quote and include a comment to that effect.

Provide a 2-3 paragraph conclusion that summarizes the article's main points and leaves the reader with the most important messages.

If this is your first article, include a 75-150 word biography.

If there are any additional texts that would be of interest to readers, include their full title and location URL.

Include 5 keywords for the article's metadata to assist search engines in finding your article.

Copyright:

You retain copyright to your work and grant the Talent First Network permission to publish your submission under a Creative Commons license. The Talent First Network owns the copyright to the collection of works comprising each edition of the OSBR. All content on the OSBR and Talent First Network websites is under the Creative Commons attribution (<http://creativecommons.org/licenses/by/3.0/>) license which allows for commercial and non-commercial redistribution as well as modifications of the work as long as the copyright holder is attributed.

The OSBR is searching for the right sponsors. We offer a targeted readership and hard-to-get content that is relevant to companies, open source foundations and educational institutions. You can become a gold sponsor (one year support) or a theme sponsor (one issue support). You can also place 1/4, 1/2 or full page ads.

For pricing details, contact the Editor chris.mcphee@osbr.ca.