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Study of the Underrepresentation of Women and Women-Identifying IP- Rights Holders, Company Founders and Senior Leadership: Final Report to Innovation Asset Collective

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Introduction – Study Purpose and Mandate

Background

In 2018 the Government of Canada (Industry, Science and Economic Development Canada) launched its National IP Strategy with a view to helping "Canadian businesses, creators, entrepreneurs and innovators understand, protect and access intellectual property (IP)"[1] Among its many policy initiatives, it identified the underrepresentation of women and women-identifying[2] and Indigenous entrepreneurs in the IP system as areas of concern.[3] Encouraging greater success for these and other excluded groups necessarily means facilitating greater participation in generating, protecting and strategically leveraging their IP.

In 2020, the Innovation Asset Collective (IAC), which was established pursuant to the National IP Strategy, issued a Call for Proposals to launch a study of women and IP in the data-driven clean tech (DDCT) sector. In 2021, the University of Windsor was selected to conduct this study (the "IAC Study").

The IAC Study

The mandate of this study is to engage in a consultation process to better understand women's experiences in navigating the IP system and, pursuant to the findings of the consultation, to develop and implement specialized education and support initiatives for IAC members in the data-driven clean tech (DDCT) sector.

The Team

Principal Investigators

Myra Tawfik is the Don Rodzik Family Chair in Law and Entrepreneurship, Distinguished University Professor, Faculty of Law at the University of Windsor and a Senior Fellow at the Centre for Governance Innovation (CIGI), with expertise in intellectual property law, especially capacity-building in IP education throughout the innovation ecosystem.

Heather Pratt is the Executive Director Office of Research and Innovation at the University of Windsor and is a Doctoral student in the Faculty of Education at the University of Windsor. She has a breadth of expertise in innovation and technology transfer systems in Canada and has successfully commercialized university IP through licensing and new venture creation. Her doctoral research is investigating barriers to women in protecting their IP and new venture creation.

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[1]Government of Canada, Industry, Science and Economic Development website at
https://www.ic.gc.ca/eic/site/108.nsf/eng/home
[2] In this report, the term "women" includes women-identifying individuals.
[3]See for example, Women's Participation in Patenting: An Analysis of Patent Cooperation Treaty Applications Originating in Canada (2017) at https://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/vwapj/Womens_participation_patenting.pdf/$file/Womens_participation_patenting.pdf. Stats Canada Intellectual Property Awareness and Use Survey, 2019 (Statistics Canada) at
https://www150.statcan.gc.ca/n1/daily-quotidien/210218/dq210218b-eng.htm. On Indigenous entrepreneurs, see for example, Canadian Council for Aboriginal Business, *Digital Directions: Towards skills development and inclusion of Indigenous Peoples in the new economy* (2019) https://www.ccab.com/wp-content/uploads/2019/02/Digital-Directions-TCS-Report-Digital-Full-Report_AA-FINAL.pdf.

Research Assistants

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Pilot Study 2020 (Myra Tawfik/Heather Pratt/Radha Lamba)

The IAC Study builds on existing research conducted by some of the same researchers. In 2020, a pilot study was initiated at the University of Windsor to provide a baseline understanding about the experiences of women and IP. A literature review was conducted, and interviews were held with 10 women who were IP rights holders (patents, trademarks and copyright).

The Pilot Study identified five key common areas of concern:

1. The lack of IP networks and mentors
2. Financing challenges (especially funding patents)
3. Corporate culture and governance
4. Difficulties with experts (especially lawyers)
5. Systemic biases within the IP environment

These themes were consistent with the existing scholarly literature especially around patents.[4] In addition, these themes tracked very closely with the overall experiences of women entrepreneurs more generally.[5] The IAC Study was designed to take these early findings and apply the same research methodology to women in the clean tech and DDCT sectors.

The IAC Study

The IAC Study consisted of four phases:

1. A July 2021 Forum to launch the IAC study
2. Interviews with women IP rights-holders and/or company founders and/or senior IP leadership
3. Preliminary report to IAC with recommendations
4. Final report to IAC with recommendations

IAC Study Phase 1: The July Forum

The forum was held on July 6th, 2021, and was attended by 18 invitees, along with the University of Windsor and IAC teams, for a total of 26 participants. The invitees consisted of

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[4] For example, Annette I. Kahler "Examining Exclusion in Woman-Inventor Patenting: A Comparison of Educational Trends and Patent Data in the Era of Computer Engineer Barbie." American University Journal of Gender Social Policy and Law 19, no. 3 (2011): 773-798. Sue V. Rosser, "The Gender Gap in Patenting: Is Technology Transfer a Feminist Issue?" NWSA Journal, vol 21, no. 2 (Summer 2009), pp. 65-84.

[5] For example, Philipp Koellinger, Maria Minniti and Christian Schade, "Gender Differences in Entrepreneurial Propensity" Oxford Bulletin of Economics and Statistics, vol 75, issue 2, pp. 213-234 (April 2013). The Federal Government has recently launched the Women Entrepreneurship Strategy with "an investment of more than $6.0 billion that aims to increase Women-owned businesses access to the financing, talent, networks and expertise they need to start-up, scale-up and access new markets" (Government of Canada, 2021)

a diverse group of women in senior leadership positions who were asked to provide remarks on one of the five key discussion themes. The floor was then opened to a general discussion from all participants. The July forum was conducted under Chatham House rules to ensure a full and frank conversation.

The July forum was intended to serve three purposes:

1. As a kick-off, to formally launch the interview phase of the IAC Study;
2. To discuss the assumptions underlying the 5 key themes that originated from the Pilot Study with a group of experts;
3. To elicit guidance, advice, and suggestions from all the participants about the IAC Study.

What follows is a high-level summary of the discussions that took place at that meeting:

The lack of IP networks and mentors

The Problem: Weak networks and lack of mentoring opportunities are common challenges for women in general. In relation to IP, women reported not knowing where to go to ask for advice and feeling intimidated by and uncomfortable with their own lack of IP literacy.

The participants agreed that women have weaker networks and mentors. This is especially acute for patents. A fair bit of discussion revolved around the dearth of women in science, technology, engineering, and math (STEM) disciplines. Canada does not have a large pool of women inventors to act as role models. As one participant remarked: "you can't be what you can't see."

The concept of mentoring was discussed. Could the term itself suggest that women are somehow deficient and need to be educated? Many participants voiced the importance of mentors for racialized women and their representation. Participants spoke of needing "champions" (regardless of gender) who have political capital to put behind women inventors and who will advocate for them. There was some discussion about the fact that women are often hesitant to self-nominate for awards, prizes and other recognitions; they felt they would benefit from advocates and champions to support them. Women should help shine the light on women's accomplishments. Issues of diversity and inclusion were raised with a view to ensuring that intersectional experiences were fully considered.

Financing IP:

The Problem: Women tech entrepreneurs have a challenging time securing investment and other sources of funding and finances to support their business venture. This has a direct impact on their ability to bear the costs of securing IP.

There was general agreement with this premise and the discussions focused on potential solutions that could provide women with greater access to capital and financing.

One participant highlighted the fact that women entrepreneurs face a larger barrier to entry to entrepreneurship than men. It takes courage to leave the safety of a job and be an entrepreneur. As women often lack the same financial safety net that men do, a suggestion was made that some funding be guaranteed to provide certainty to women entrepreneurs. Another observed that women founders were often not prepared with a financial plan for their company and did not have a clear value proposition of their products and services, putting them at a disadvantage

in comparison with male founders. It was suggested that more education on how to raise money and how to use IP to secure financing and make better financial decisions would be useful.

Other participants noted the absence of women investors. The current network of investors frequently takes women less seriously and views their inventions less favourably than their male counterparts. This leaves women-led companies with fewer options and less financial support than their male peers, regardless of the potential of their business or invention. Increasing the number of women investors in the tech industry would be welcome.

Corporate culture and governance

The Problem: Male-dominated corporate culture can marginalize women's contributions to a company's research and development and innovative activities. It can also hinder her advancement into IP leadership roles.

The participants agreed that corporate culture remains heavily male-dominated. This is reflected in a number of biases (both personal and institutional) against women, and judgments about their abilities, legitimacy and competence. These gender stereotypes undermine professional and entrepreneurial progress. Prejudices towards working women in general remain prevalent, including erroneous perceptions that women are followers and are more comfortable playing supporting and nurturing roles, and that they are averse to competition and power.

Other examples of stereotypes were that women are less rational and do not see commercial implications in the same way as men so they cannot be trusted to do important tasks. A participant noted that there are differences in the way in which investors approach and ask questions of men founders versus women founders. Male founders are more frequently asked promotional and growth questions (such as "What is the next big step?") while women founders are more frequently asked questions regarding venture failure and their risk mitigation plans.

Issues were raised about the way women are socialized. For example, one participant observed that women are often afraid of taking up space within an organization and are frequently apologetic when they ask questions. Another said that the solution is not just about getting women in the room but making sure they are in the right room, and they have the right language so that they can ensure they are being heard.

Difficulties with experts (especially lawyers)

Women report difficult encounters with IP professionals, especially lawyers. They described feeling talked down to, mansplained and not taken seriously.

There was a recognition among participants that IP is inherently difficult, especially patents. Almost everyone at the event noted that there is a significant lack of IP education, and that greater literacy would raise women's comfort levels in dealing with experts and investors, among others. Some at the meeting commented that obtaining IP knowledge at a younger age and 'demystifying' the world of IP would alleviate discomfort in talking to IP professionals. A few women called for IP education to be included in high school curricula or for undergraduate STEM students. The experience that inventors have with their IP professionals can determine their likelihood of repeating the process.

There was some discussion about the fact that experts may not always be aware of their actions and that clients may have to communicate their needs to the experts more clearly and forcefully. Other participants differed, arguing that the onus lies on experts. Experts must be equipped

with information and training on how to be more sensitive and responsive to the particular experiences of women founders and inventors.

Systemic biases within the IP environment

This theme encompassed a broader set of experiences relating to the implicit assumptions and biases within the IP system that place women at a disadvantage. This includes gender stereotyping (who is an 'inventor'), gendered IP laws, and assumptions about the kinds of businesses women establish (social enterprise versus tech company).

This discussion focused on identifying the stereotypes and myths that plague women inventors and entrepreneurs. Many participants spoke about their personal lived experiences.

Within the entrepreneurship and the IP system, women are perceived as being less interested in commercializing their inventions, less willing to take risks, and less competent in their field, reinforcing existing biases against women in male dominated fields. Women's inventive capacity is often marginalized and discounted.

Systemic disadvantages also arise due to the lack of recognition of the unpaid care work that women disproportionately provide. This work affects the time they can devote to their businesses, to developing their networks, securing financing, and generating and protecting IP. Because unpaid care work is largely taken for granted, the entrepreneurship and IP ecosystems do not provide accommodations or measures to ensure substantive gender equality: "If you don't count it, it doesn't count". This problem has only been exacerbated during the pandemic, which placed a disproportionate burden on families, and mothers particularly.

The discussion ended on a hopeful note as participants recognized that there are many more women-led businesses in Canada and that these women feel increasingly empowered and are advocating for themselves more often.

IAC Study Phase 2: Interviews

Methodology

To launch this phase of the IAC study, University of Windsor Research Ethics Board approval was obtained to conduct interviews with 20-25 women who were either IP rights holders, and/or CEOs or company founders and/or senior IP executives. Participants received a modest financial incentive of a gift card of $100 per participant. Each participant signed a Consent to Participate Form.

The participants were recruited from a variety of networks. A Call for Participants (see [Appendix 1](#)) was sent by email to the participants at the July forum, who circulated it through their networks. The Call was also circulated through social media such as LinkedIn and promoted by the investigators and stakeholder organizations. Some women e-mailed the investigators directly in response to the Call. In other cases, introductions were made by third parties. Co-Investigator Heather Pratt contacted volunteers to schedule a time for the interview, and participants received advanced information about the study in the Consent to Participate in Research form by e-mail. They were then requested to send back a signed copy of the form prior to the interview. Interviews were conducted virtually over Microsoft Teams in a semi-structured format and recorded for transcription purposes.

The interviews consisted of seven open-ended questions. The aim of the interviews was to hear from participants about their experiences navigating the IP system and to learn from them about any obstacles or barriers they encountered, and whether they believe these obstacles or barriers exist or are exacerbated because they are women. The interviewees were also asked to offer

solutions. The interviews were transcribed and coded for common themes, with major themes and meaningful quotes selected for inclusion in this report.

A total of 21 interviews were conducted in English between July and November 2021. Although the Call for Participants was released in both English and French, none of the participants asked to be interviewed in French. Each interview lasted approximately 30-40 minutes.

The participants were identified as "Primary" or "Intermediary," depending on their role. The "Primary" group of participants consisted of women patent-holders, CEOs or founders or founding members of Canadian cleantech and/or DDCT companies, or senior IP leaders within those companies. The "Intermediary" group included patent agents, IP lawyers, IP strategists and IP portfolio managers. In total, 15 Primary and 6 Intermediaries were interviewed. In terms of the stage of growth of the companies within the Primary group, 10 were early to mid-stage start-ups and 5 were more established companies (later stage start-up or scale-up).

IAC Study Phase 3: Interim report

On September 23, 2021, preliminary findings and recommendations were presented to IAC based on the discussion at the July forum and after the completion of 12 interviews.

The preliminary report recommended that IAC should:

- Promote an equity, diversity and inclusion (EDI) culture at IAC

- Establish a dedicated grant for women to support the costs of patenting

- Develop an inventory of expert intermediaries who understand gender biases

- Provide educational and coaching programs for women working in IP

- Build a community of champions, mentors, and coaches

- Launch a community of practice pilot program

- Develop metrics to ensure that these recommendations achieve the desired outcome.

IAC was receptive to these recommendations but accepted that these were only interim given that the researchers might have additional recommendations or comments once the full schedule of interviews was completed. Phase 4 of the IAC Study, set out in the remaining sections of this report, encompasses the findings and recommendations derived from the complete set of 21 interviews.

IAC Study Phase 4: Final Report of Findings

All the interviewees provided a variety of insights on the five key themes that informed this study. What follows is a summary of these thematic findings followed in each instance by anonymized quotations from some of the 21 participants. Some of the quotations have been modified and extraneous language deleted to ensure legibility or to condense them.

Challenge 1: Lack of IP Networks and Mentors

The absence of IP networks and mentors emerged as one of the strongest themes. Ten respondents indicated that a challenge and/or barrier that they have experienced is the lack of female representation and mentorship. Nine respondents indicated that knowledge of IP processes, the IP landscape, and how to incorporate IP into organizational strategy at the beginning of a new venture were critical to success, but some participants acknowledged that

they did not know this at the time they were starting their venture or career, or they felt ill-equipped to navigate this space. Some respondents indicated they would learn better from one and another and would feel more comfortable engaging and asking questions in a more women-friendly space.

Some quotes from participants:

> *"I think quite often it is very challenging for women to get access to those same kinds of networks.".*

> *"You don't know who to talk to. You don't know where to look for advice. There's no one really there where you can casually approach and just talk to, have a coffee chat about it, just talk to people about it. There are not many women. And then even with the men and other people in the company, the connection is just not there. For mentoring, I've just had very few people who would actually talk to me and advise me on something, very few people who did that all along the way."*

> *"...part of me wonders whether that it isn't such a big upstream problem that if there was more equity and representation by women at the inventor-engineering level that having women get their own IP and their own patents would just naturally come out in the wash, but it would be proportional to the amount of women actually working in the field."*

> *"I do think what would help is just making sure that women who are in executive positions in technology companies have a basic IP knowledge because then when they're mentoring other women in STEM positions and in those companies, it's just a topic that is more top of mind."*

> *"And I didn't know, are there talent development programmes for women to become inventors, like what are they doing about that pipeline? I'm sure we want to have a different picture but is the talent pipeline being promoted to change those numbers, I don't know."*

> *"I think what they need is, is champions. They need people to lift them up to tell them they're doing a great job and promote them to the next level. I think we also need metrics. I think people care about things that are measured and I don't think enough companies are measuring what their numbers are in terms of onboarding and retaining women. And I think if we can do that, if we can get enough women through the door, and if we can keep them there then, then the problem about lack of women inventors lack of women entering the IP field, I think they'll naturally go away. I think that'll be the by-product of just having a critical mass of women. .... It's not about women not entering the IP field. It's about women not entering the engineering field, in the innovation field."*

Challenge 2: Financing Challenges

Barriers associated with the costs of filings of patents and protecting other forms of IP were reported by a majority of participants. Thirteen participants in the study indicated that the costs of IP, from legal fees to filing fees, were a barrier to women entering the IP environment. As one participant put it: *"Well, I mean cost is the number one barrier."*

Some participants commented on the impossible situation they find themselves in when they are seeking financing. Investors will not invest in their ventures unless they have protected their IP, however, in many cases, funding is required to protect their IP. Additional challenges

were highlighted by several participants relating to securing financing through pitches to venture capital firms or other organizations. The majority of venture capitalists are male, and women are not as successful in securing funding to support their start-up/scale-up ventures. Three respondents indicated that men were assumed to be the preferred inventors within the IP environment. Several of the study participants indicated that raising funds represented a greater challenge for women than men and greater government resources would be beneficial to help remove barriers for women.

Some quotes from participants:

> "If there can be a way to actively assess value, IP value for female founded companies, so that they have a shot at being taken seriously. I don't know what that solution is. I don't have a suggestion, unfortunately, but that's what I'd love to see happen."

> "... women get, depending on the stat you look at between 2 and 4% of venture capital financing and you're certainly not getting that without your IP in order and I think that, again, this is just like such an important first step for women to get this behind them, to bolster any sort of funding pitch that they're making, to have their all their IP strategy figured out. So this is a really important part of the market that needs to be addressed."

> "One of the first five or six questions you get from an investor, VC or otherwise is who are your competitors and how were you protecting yourself against them, and in our current answer in Canada seems to be well, we don't do that part, right? Like we can't afford to do that part and it's .... just, yeah, it's silly."

> "I think I've become quite jaded, because I think I view it as the ability to actually talk the male talk to actually get funded."

> "There's this laser focus on investment instead of on a viable business that actually generates revenue and is investable, like all they want to do is create this illusion of investability, people were more interested in me knowing how to write an IP strategy than they were about me actually understanding what that strategy meant and how to implement it in terms of scale and growth and IP defence instead of in terms of look good to an investor and provide them a portfolio that looks like it's worth investing in."

> "You're kind of pushed around, you're directed by the funders, by the men in VC. Because VC's are mainly men."

> "I've been successful in being awarded my patents, but overall I think it's cost me way more than I should have spent just based on lack of experience in it and not getting the right partner at the beginning."

> "Most entrepreneurs don't budget enough for their patents and so that is one of the reasons why lawyers don't really like working with start-ups, is they don't have money. I would love to see more subsidizing of the patenting process by the Canadian government."

Challenge 3: Corporate Culture and Governance

The participants of the study also indicated that corporate culture and governance presented a barrier, especially in tech and STEM industries. Four of the respondents indicated that the IP environment can be a hostile working environment, with some respondents indicating that this hostility is related to gender. Six respondents indicated that women tend to work within or navigate the IP environment differently because of different working styles than their male

counterparts. For example, some women described themselves as being more collaborative, risk-averse, and prefer greater levels of communication. Some respondents indicated that these traits put women at a disadvantage and impeded their success.

Some quotes from participants:

> *"But there was just kind of an understanding that the women in the office were not going to progress as fast as, as the men in the office. There wasn't... There weren't the same perceived opportunities. So, from that perspective, I found being a woman in IP very difficult."*

> *"It's mostly men in my industry. I mean there are many instances where I will have a man who works in the company, have the tough conversations with those people, with those companies, he has no background in the industry at all, but they'll listen to him more respectfully than me."*

> *"And I think that we need to come a little bit more armed, we have to come a little more intelligent to the table than the men. And we're capable of that because we're far more intelligent. We're way more resilient and we're way more intelligent. We think very differently than men. I think just making sure that when you – you are very educated before you come to the table to talk, to speak. That you know what you're talking about. And that way you can hold your position and be willing to say, "I don't understand that, can you explain that?" And sometimes they can't even explain so it's up to you to go find that information and to present that."*

> *"One of the experts that's managed to funnel a lot funding into my industry, he has been the biggest barrier for me in in the community because he always points out that I don't really understand what it is that I'm doing. And, now we have a product on the market that was used by the organisation who sets the standards for the industry ... But at every stage he has really made an effort to make me look stupid."*

> *"I would say that women are less often asked questions like you know, "are you going to patent it?" I think of women, Tech – women entrepreneurs, they aren't asked that question. I think women are potentially less likely to patent something."*

> *"In terms of genderfication, I think the IT world is really ... It's somewhat I want to say "cutthroat" but women are sometimes pushed aside and they don't have the right authority, voice."*

> *"And I think there is still this inherent bias that women don't tend to have the same kinds of IP skills, so I think when you look at patent filings, they're still mostly men that are filing those patents, and even in my own context from ... I'm pretty lucky that I have a male founder that understands that I bring value to the table, but quite often it's our patent counsel that's reminding him that I should be named as a co-inventor because some of those items is originated from me as well, so it's really just, I think there is, you know, some inherent biases."*

> *"It kind of all started from the beginning – I guess years ago – when I would show my interest in understanding our patents, being new to the organization and the engineers would say "Oh, that's something you don't understand". And I think they really just gave me some garbage response, so that I would be even more confused. And I was like "Okay, this isn't making any sense to me. Why are we doing that?" And it wasn't until I took ownership of this and said, "Listen, I really want to know this". And what I did*

was I went out and I learned everything that I could about IP, about patents. I said "this is something we really need to internally take ownership of. We can't rely on external all the time. We're wasting far too much money just understanding definitions when we could be taking this internal."

Challenge 4: Difficulty with Experts (especially Lawyers)

Another key theme that emerged was the challenges that the participants have encountered in dealing with IP experts, most notably lawyers. Thirteen respondents indicated that they relied on lawyers and/or other legal support systems. Many respondents found these resources to be useful, but some were frustrated with the services that they received. Several participants also indicated that they would send in their co-founders, or other male counterparts within their organization to deal with the IP lawyers or other business service providers because they felt they were not being listened to, or their contributions were being marginalized or discounted. This strategy was conveyed to be the path of least resistance, but also provided the participants with the ability to not have to address the negativity while enabling them to focus on their start-up or scale-up and monetizing their IP. Several participants indicated that they actively seek out women, and members of other equity seeking groups to provide legal expertise, IP support or business support.

Some quotes from participants:

"... dealing with lawyers I feel is always a strange process."

"There's a lot of legal language involved in patents ... I feel that communication could be better from the IP professional to those who are not IP professionals so that they understand the basic, fundamental concepts and then that will help them because a lot of the time it's just very confusing and like two different languages being spoken."

"It's a very technical and complex field and it's not easy to access the right person for the right project at the right moment. So, I would say that it's very arcane ... Intellectual property law and IP information for your situation is a difficult proposition. And I'm sure we can improve general information, access ... Maybe it's a question of communication, I don't know."

"I have seen gender related issues with respect to examiner interviews and in terms of prosecuting the patent applications, so I'll have female patent owners who need to bring their male counterparts to assist with the Examiner interview and there can be some sticky issues around that."

"I think there's this tendency to wonder if a woman is technical or not. And I think from the patent perspective, you know, there's this intensity about talking with technical people. And if you're not technical, you know is, is that really you know, time well spent?"

"We continued to innovate, and we believed we had something that was worth patenting. So we then went to a couple more firms. We had some grants through them that allowed them to do some work with us and we found that there – there was just a lot of hesitancy. I don't know if it had to do with a gender role or if it had to do with the fact that these were Canadian firms, but there was a lot of like fear around patenting certain things. And the best way to explain that is like the difference we felt when we

went to US attorneys. So when we went to US attorneys they were like, "You can put in all of this. You should have patented this stuff years ago" and we were being really conservative because we just felt like we had to innovate so much an prove so much before even considering a patent."

"I'm the leader of the business, I'm the CEO, but I'm not the point person for the patent lawyer my partner is on that, and largely because we find it's easier to send an old white man to deal with lawyers than it is to send a younger lady. I'm very involved in the process throughout, but we're finding it much easier to have a man as the point, the touch point for that, the US lawyer he's brash and US and pushy."

"Just based on volume, the law firms work on volume mandates, and they'll give better service and better more, more free advice and expertise to companies that are spending lots of money on IP than they are to the lower-level entrepreneurs and start-ups. When in-reality you almost need the reverse of that … You need better handholding of the entrepreneurs to, to educate the entrepreneurs, whether female or not female, on the 'IP."

"[There is] the idea that you have to patent to improve your company's valuation. I think this is creating a system where people are patenting things that should not be patented or cannot be patented, simply to look a certain way as a company. So kind of the splitting of usefulness. So you've got people that are patenting and lawyers that are putting things that are aren't going to get approved and have no real value, but they're doing it because this is what you do in a tech company and then you have people who are creating intellectual property or perhaps don't fit into that mold, who would like to actually protect things, but because it's not a simple case, there's this, you know it's not a quick and dirty patent application that, you know we're pushed off to you know, 'Well, that's going to be too complicated, we want, you know, something really simple' that that gets more people through the door, and so stepping away from the idea that patenting is something you should be doing, regardless of what you've actually created would be a good step, but I know that's not realistic."

"I think initially when I was working with the initial counsel that I was working with, there was a degree of scepticism as to whether or not I understood the technology, particularly given that my male founder is so much more technically adept than I am, so there is that degree of perception, right?"

Challenge 5: Systemic Biases within the IP Environment

The interviewees raised numerous examples of systemic biases within the IP environment. Overall, the participants of the study felt that the IP system was not supportive of women whether in protecting their IP, or in securing financing. Five participants spoke of being subjected to the stereotype that women are not 'technical' and described the impact in terms of their (perceived) unequal treatment. As one interviewee described it: *"… it is really tough to get your voice heard… It is really, really tough.".* Another participant referred to being 'pigeon-holed': *"even when I go to a conference, I am often pigeon-holed as a life sciences person, whereas I'm a computer electrical person."*

Others spoke of microaggressions and not being taken seriously. They reported feeling patronized, undermined, dismissed an underestimated. Challenges to their credibility and legitimacy affected their confidence in their ability to be successful.

Some quotes from participants:

"It's just hard to pinpoint exactly what but generally I'd say it's more experienced in kind of microaggressions and things like that and maybe unconscious biases that people have that are more of like a traditional view of kind of a woman role that maybe have not adjusted to modern day and truly viewing women as equal."

"Overall, I don't think women-led businesses are taken as seriously and if they are taken seriously, I think there's a higher barrier of proving that the company is valued, so you know, there's examples where I can say some things like 'Oh well, this is what this does and this is the value of it'. And I can tell that they don't believe me, so I just get my [male business partner] to say it, right? It's very straightforward like that. It's not really hidden, it's very obvious and you know we have ways to deal with it in company. Calling in the guys to have calls with other guys kind-of things, but that's not necessarily ... It wasn't unexpected, and it's something we deal with regularly anyway, so I would say, for the most part when we do make inquiries about certain things or make have questions that I feel like our company isn't taken as seriously because it's led by a woman."

"I started to clearly identify what was happening because we were starting to see some really blatant patterns, I occasionally discussed it with a few of my mentors who I am close with, but all are men. And even though they had been working with me for ages and I was a trusted, reliable person, when I told them that was happening, every single one of them told me that was not what was happening, even though when I spoke to women and describe the same pattern, they were like 'Oh yeah, exactly that's what's happening'. So I've tried to ignore it all up, like really actively trying to ignore it all because it's making me upset and jaded and it's still process that I have to get all the way through."

"As far as entrepreneurs, definitely bridging that gap between ideations to IP to start-up would be impactful for female founders just getting that confidence that you have that IP behind you, that you're you know that on your way to your start-up venture that you've got a good strategy in place for your IP."

"I think even just looking at how the start-up ecosystem is presented. We learn this and see this often, where these white middle-aged men will go out there and raise millions and millions of dollars on like an idea and napkin mat and we just don't have the confidence to do the same. So, I think it did come down to a confidence issue because when we talked to the right lawyers that were as ambitious as us and they were like you know you should have done this a long time ago."

"So, the dismissiveness and the devaluation. If there is a way and I don't know what the way is, of highlighting that that happens and I don't know is it a change of language, is it just making people aware that this happens, or why does this happen, or what? You know, there's a great Ted talk about how women are asked different questions by investors than men. And that often times women are asked about how are they going to handle failure... what is their Plan B, Plan C whereas men are asked about how they're going to grow and scale and what the investor can do to help with that. In her presentation, she talks about how you pivot the conversation away from failure and towards growth and scaling, and that you have to do it repeatedly within a single meeting, and that if you know. So that's one tool that I use now pretty actively. And it's not to shame the person, but I can't keep talking about Plan B and plan C When our

plan A is phenomenal. But we don't get to discuss it because we're discussing how I'm going to handle failure. But I thought I was here to pitch you my plan, not pitch you how I deal with failure."

"Well, I actually ended up hiring a coach because my rage was so bad and I was sabotaging meeting because I was just furious and bored with the repeated nature of the meetings. And it's still yes, it still happens. Yeah, the norm? But for me to have tools so that at least I feel I'm leaving a meeting with my morale and confidence not completely obliterated, that I have tools to maintain... remain calm and grace in the midst of experiencing a conversation that I shouldn't, I shouldn't have to deal with."

"Now that probably doesn't detect bias that well, because my name is never on the patents either, which, I mean that they probably could be if I insisted, my partner puts his name on there even though he contributes about as much as I do. To the actual like scientific discovery, so there's no female names on our patents."

"Reflecting back on why we didn't file this patent earlier. I think part of it was doubting our innovation for so long probably had to do with the fact that our entire team is just women in STEM. We're just three females with a science or business background. I think putting myself in the shoes of someone with like a little bit more of a privilege."

Some interviewees recognized additional characteristics or factors that made things more challenging for them. Being younger or older or a woman of colour exacerbated the systemic barriers they had to contend with as women.

"I haven't really encountered a lot of difficulties dealing with the outside experts, but I do know that when I walk into the room or get on a call I do get underestimated at the first. You know, being a woman or being a woman of colour or... I mean some of the comments I would get ... first thing is ... 'Oh my god your English is so good' ... because ... I mean, there's certain assumptions. So, it would start, definitely start with that, but once we would get started it would be much easier to get along, get across my point. So I kind of got used to that over years, but yes, there is some sort of underestimation that happens at first little bit. It's bias – conscious and unconscious."

Younger women reported having their legitimacy and credibility frequently challenged.

"I think the capacity is specific to gender relations. I believe that there's much progress in 2021 as opposed to what happened in 1998. However, there is a modus operandi. There's a methodology. There is a way of doing things that perhaps younger women in a business world, in particularly with finance or technology in engineering ... those gaps may still very well exist today."

"I think that the most, bad interactions I've had are from like older men, so I just want to add that age has played a factor too, like dealing with an older man, with more traditional ... that's almost always the worst. When somebody I'm talking [to] about something regarding to IP or anything like that - if it's an older man, that's generally when it would be ... 'oh good girl' or kind of say things that are really inappropriate, that kind of would oppress me in that way. So anyway, it's generally like age plays a factor as well."

Experienced and successful women at the other end of the spectrum reported similar patterns because they are not seen as 'tech savvy' due to their age. One participant stated "*You can't win. Either you're too young or you're too old. There's a sweet spot in there. I think I hit my sweet spot in my 30s, where I had credibility to do what I was doing.*"

Other considerations

The interviews also elicited insights about the resources provided by the business incubator/accelerator system. While many of these incubators and accelerators were able to provide some modest financial, business and IP education resources there was insufficient support beyond the start-up stage, and some reported being treated differently from their male counterparts.

> "*So then after the patent was done, I went through a couple different accelerators. In those accelerators, though I didn't have any IP assistance or funds for IP, most of those accelerators wanted me to have already filed my IP before I worked with them.*"

> "*I guess the thing then is that if there is an IP programme and this I would say, you know, I've noticed like I get contacted to be in a lot of incubators and accelerators and for a while I got into the mold. And I would say at the end of it 'OK, So what now? Uh, what happens now?' and it was basically well, you know, good luck, we've helped you write a business plan, or we've helped you, and it's like, well ok, but I already had a business plan, what now? And of course, you discover subsequently that there were investors in that programme who were investing in companies. But unfortunately, the women didn't really get access to the investment opportunities.*".

In some cases, participants felt that their involvement in incubator programs was merely a 'tick-box' exercise, that they provided the incubators with a positive metric to report to their funders.

> "*Unfortunately, a lot of these programmes ... they need women to check the boxes for diversity, but they have no real intent behind that. So, I would say, you know only accelerators, incubators that have a real process and plan around how to support diverse communities should really be able to leverage money that they're accessing.*"

One participant noted that the same systemic biases can influence the way in which women judge the businesses or technologies of other women:

> "*I also sit on an advisory board for an organisation and it's for female founded companies and it's quite interesting because even when the applications are being judged for funding and support and all those things, the products that are more soft female type product ... they aren't given the same degree of credit, for lack of a better word when you're comparing it to other technologies that are more driven to things like general AI applications or something that is pervasively used amongst all genders.*"

IP education and awareness came up frequently during the interviews. Many of the participants indicated they were self-taught in IP, not having studied IP during their formal education. Many made references to the resources that they have accessed to improve their own IP knowledge and awareness. Five respondents indicated that they have used or would recommend using the internet as a resource for learning about and navigating the IP system. Six reported that they acquired basic knowledge and information from business incubators or accelerators. Eight respondents indicated that they have used or would benefit from introductory courses on

navigating the IP environment. This reference was also reflected in expanding post-secondary education to also include introductory courses in IP education and awareness.

Several women indicated that they would benefit from women-specific educational resources related to IP. Many of the participants stated that they would learn better from one another and feel more comfortable to ask questions and engage in a more female-friendly space.

Ten respondents indicated that the subject of IP and IP education is largely missing from post-secondary curricula and that this gap results in a barrier for future inventors and/or entrepreneurs.

> *"I don't think it would be misplaced to have it in the high schools to be thinking of a new idea and putting together some kind of plan of how to develop that idea into a business, as an exercise. And that IP protection could be part of that lesson."*

> *"Just having something basically like having requesting to add these programs, to universities or like for example, like having some sort of training workshops, something for – starting from universities. Now that we have these entrepreneurship courses, why not having one syllabus or one separate course just for IP? That would be definitely very helpful."*

> *"I think there is a big gap in the academic programming about patenting. I think a lot of students can go all the way through undergrad and grad school without having any awareness of patent databases or how to even look up if you have an idea. Even like a new can opener, you should have the skills to go on the web and see if your idea is already out there. In my opinion, you should be able to do that, not just for an in-depth idea in your little niche. Why can't we have those skills present from a from a young age?"*

Conclusions and final recommendations

Our final recommendations are consistent with those delivered to IAC in our interim report. The remaining 9 interviews confirmed and reinforced the findings from our first 12 interviews. The responses from the study participants suggest that the underrepresentation of women in the IP system would be best addressed through an equity, diversity and inclusion (EDI) framework as a starting point. The question of underrepresentation in IP cannot be divorced from the entire experience of being a woman in the clean tech and DDCT sectors.

By implementing these six recommendations as a package, IAC will provide a responsive, and inclusive eco-system for women, which will encourage greater participation and success in the generation, protection, and commercialization of IP. [6]

What follows are the recommendations based on the findings of the IAC Study:

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[6] The mandate for the research was limited to women as an underrepresented group. Although outside the scope of this study, the recommendations below could apply and be adapted to all underrepresented groups in the IP system.

Recommendation 1: Promote an Equity, Diversity and Inclusion (EDI) Culture at IAC

This report recommends that the IAC **adopt an equity, diversity, and inclusion (EDI) culture within the organisation.** For the purposes of this report, equity, diversity and inclusion are as defined by the Canadian Centre for Diversity and Inclusion (www.ccdi.ca).

IAC operates in STEM- and patent-heavy environment, and risks perpetuating the systemic biases and inequities that were described by the women who participated in the IAC Study. IAC must be pro-active and responsive to gender-based issues to eliminate unintended or unconscious biases within the organization itself as well in the way in which it offers its programs and services to women. By creating a culture of EDI within IAC, IAC will play a key leadership role in changing the IP and entrepreneurship culture within the Canadian clean tech and DDCT sectors (and beyond).

To create and sustain an EDI culture within IAC, it is recommended that IAC:

- Develop and adopt an EDI policy and EDI practices;
- Provide IAC leadership and staff with EDI training which can include:
    - Unconscious Bias Training - https://www.chairs-chaires.gc.ca/program-programme/equity-equite/bias/module-eng.aspx
    - Gender Based Analysis (GBA+) Training – https://women-gender-equality.canada.ca/en/gender-based-analysis-plus/take-course.html
    - The Centennial College Leadership and Inclusion Certificate program https://ccdi.ca//centennial-certificate/
- Consider becoming a member of the Canadian Centre for Diversity and Inclusion (CCDI) to leverage the broad range of EDI training and support that is offered. This membership would also serve as a strong engagement tool for the IAC in communicating to its membership that EDI is valued within the organization.

Recommendation 2: Improve IAC Service Offerings

IAC service offerings must be designed to enable the identification of any gender-based issues. They should be implemented with a view to eliminating unintended or unconscious biases in the way in which IAC offers its programs and services to women. In its role as a trusted adviser, IAC should be aware of and actively scrutinize the ways in which third party service providers provide their services to women.

IP experts play a unique role in supporting women founders and inventors in building confidence in their IP and their IP strategies. IAC can refer women founders to the experts on this list and solicit feedback from the women on their level of satisfaction with the third-party services.

To redress the systemic issues around expert service providers, this report recommends that IAC:

- **Develop an inventory of expert intermediaries** (lawyers, patent agents, IP strategists, business mentors) who understand gender biases and who have a proven track record of working with women founders and inventors.
- **Actively solicit feedback** from the women on their level of satisfaction with the third-party services in terms of the way they were treated.

Further, the IAC study confirmed the challenge that women continue to face in securing funding from investors to protect their IP. To redress this specific weakness in the system, it is recommended that IAC:

- **Introduce a dedicated grant for women** to support the costs of patents or other forms of IP.

Recommendation 3: IAC Education Offerings

Women face specific challenges in terms of their levels of IP awareness and education. They are also not frequently visible or represented in education programming or as IP success stories. As one July forum participant encapsulated the problem and the solution: "you can't be what you can't see."

For IAC to increase the visibility of women in IP and provide them with the educational tools and skills to give them the confidence to operate within male-dominated IP environments, this report recommends that IAC:

- **Raise the visibility of women throughout its IP education programming**. This would include being mindful of the composition of panels, the content selected for case studies and the examples used for IP success stories. In addition, education and awareness programs should be offered that explicitly discuss gender-based IP issues, to raise awareness across the sector about systemic challenges and to develop effective ways of addressing them. This can take the form of workshops or panels on unconscious bias within the patent examination process or the reasons why women are clustered in specific STEM areas and the implications of this segregation.
- **Provide educational and coaching programs** to prepare women for investors pitches, grant applications and other funding and financing activities as well as for their meetings with expert intermediaries. The content of these programs should explicitly recognize and identify the systemic issues women face in these environments.

Recommendation 4: Build a Community of Champions, Mentors and Coaches

Access to mentors, champions and coaches resonated with the women who participated in the July forum as well as with the interviewees. Many women reported not having anyone to ask about their IP and not feeling confident with their level of IP knowledge in their exchanges with IP expert intermediaries. It was clear from the results of the study, that women continue to be challenged by the lack of access to IP networks.

To address this systemic challenge, this report recommends that IAC **identify experienced women interested in acting as IP coaches, champions or mentors** and create a formal matching program to connect them to women looking for IP guidance, advice and support.

Recommendation 5: Community of Practice Pilot Program

This recommendation is intended to address the lack of peer networks for women that provide a safe space for them to share their ideas, knowledge, and experiences. Our study findings highlight the fact that the current IP environment is frequently not a welcoming one for women. Women should be able to ask questions and seek guidance without fear of judgment, dismissal or censure.

To redress this deficiency in the current system, this report recommends that IAC **launch a Community of Practice Pilot Program (CPPP)**: a peer network led by women and intended

for women to meet, build trusting relationships, ask questions of one another, discuss IP, IP and business strategy and anything else that is relevant to the group. This could involve establishing a regular face-to-face or online forum. The group would decide on format, frequency, and other logistical issues. IAC would act as facilitator of this peer network and as a resource to support its activities.

Recommendation 6: Develop Metrics to Measure Progress and Success

Finally, this report recommends IAC **develop metrics to ensure that each of recommendations identified above achieve the desired outcomes**. IAC should identify Key Performance Indicators (KPIs) that will measure performance and evaluate success. The metrics should provide quantitative and qualitative evidence to demonstrate success or highlight a gap or shortfall. This will enable the IAC to remain continuously vigilant and pro-active in its commitment to correcting the systemic issues that prevent women from being full participants in the IP system.

Appendix 1: Call for Participants

Volunteers Needed for Research Study on Women and Intellectual Property

July 2021

Professor Myra Tawfik (Faculty of Law) and Ms. Heather Pratt (Faculty of Education) at the University of Windsor are conducting a study to determine the level of Intellectual Property (IP) knowledge of women and women-identifying entrepreneurs ("women") and, more specifically, their experiences in navigating the IP system, with a view to identifying any systemic obstacles to their full participation.

Participation will involve an on-line interview (in either English or French) for a maximum of 60 minutes.

You may qualify to participate in this study if:

1. You are a woman or identify as a woman and;

2. You hold a patent or are named on a patent or own some other form of intellectual property (IP) and/or;

3. You are the founder of a clean-tech company that holds IP, or you have a senior IP leadership role in a clean-tech company that holds IP (example CTO, CSO, VP, etc.).

In appreciation of your time, you will receive a $100 gift card to Indigo.

If you are interested in participating in this study, or would like more information, please contact:

Professor Myra Tawfik   Ms. Heather Pratt
mjt@uwindsor.ca   hpratt@uwindsor.ca

This research study has been reviewed and approved by the University of Windsor Research Ethics Board [REB Protocol Number 20–018] and is funded by **Innovation Asset Collective (IAC)** (https://www.ipcollective.ca/).