Non-Traditional Occupations in America’s Workforce: Barriers and Solutions to Female Participation
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OVERVIEW
Non-traditional occupations (NTOs) for women are defined as those for which females comprise less than 25 percent of those employed in the occupation. Occupational segregation – men primarily working in occupations typically performed by men and women primarily working in occupations typically performed by women – are persistent features of the U.S. labor market. According to 2014 data from the United States Department of Labor, women represented less than 25 percent of workers in more than 125 occupations and less than 10 percent of workers in more than 75 even more segregated occupations.

Barriers that discourage or prevent women from entering NTOs (e.g., engineering, construction managers, software developers and computer installation, welding technology) limit their access to high-paying jobs and exasperate the gender wage gap. In 2014, women represented less than 15% of workers among 18 of the top 25 highest paying NTOs for females. Figure 1 shows the top 10 fastest growing of these high-paying industries. These occupations offer wages far over the U.S. median annual wage of $47,230, promising high levels of financial security for entrants.

The under-representation of female workers in certain occupations continues to limit access to career pathways that could lead to high-skill, high-paying jobs among these populations.

Questions and comments can be directed to IMPAQ International. For more information visit www.impaqint.com or call (443) 259-5500.
While many of the highest paid NTOs typically require at least a college degree (e.g., engineering and computer science), 5 of the 10 fastest growing and high paying NTOs generally do not. However, women generally represent a smaller proportion of those requiring less formal education or training. For example, females are just 1.2% of those employed as electrical power line installers and repairers and 3.3% of supervisors of construction compared to 12.1% of computer network architects and 12.6% of civil engineers. Employment in NTOs can lead to higher paying jobs for women who do not have a four-year degree.\(^1\)

**Figure 1. Top 10 Fast-Growing, Highest-Paying Female NTOs, 2014**

<table>
<thead>
<tr>
<th>Occupation Title</th>
<th>Percent of Workers in Occupation who are Female</th>
<th>2014 Employment (in thousands of jobs)</th>
<th>% Predicted Growth in Jobs 2014-2024</th>
<th>2014 Median Annual Wage (in Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Occupations</td>
<td>46.8%</td>
<td>135,128</td>
<td>6.5%</td>
<td>$47,230</td>
</tr>
<tr>
<td><strong>Computational Sciences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Security Analysts</td>
<td>19.7%</td>
<td>70</td>
<td>17.9%</td>
<td>$88,890</td>
</tr>
<tr>
<td>Computer Network Architects</td>
<td>12.1%</td>
<td>114</td>
<td>8.7%</td>
<td>$98,430</td>
</tr>
<tr>
<td>Civil Engineers</td>
<td>12.6%</td>
<td>360</td>
<td>8.4%</td>
<td>$82,050</td>
</tr>
<tr>
<td>Network and Computer Systems Administrators</td>
<td>15.9%</td>
<td>218</td>
<td>7.9%</td>
<td>$75,790</td>
</tr>
<tr>
<td>Mechanical Engineers</td>
<td>8.3%</td>
<td>323</td>
<td>5.3%</td>
<td>$83,060</td>
</tr>
<tr>
<td><strong>Other Occupations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Power-Line Installers and Repairers</td>
<td>1.2%</td>
<td>119</td>
<td>11.0%</td>
<td>$65,930</td>
</tr>
<tr>
<td>First-Line Supervisors of Construction Trades and Extraction Workers</td>
<td>3.3%</td>
<td>712</td>
<td>10.0%</td>
<td>$60,990</td>
</tr>
<tr>
<td>First-Line Supervisors of Mechanics, Installers, and Repairers</td>
<td>6.1%</td>
<td>262</td>
<td>5.4%</td>
<td>$62,150</td>
</tr>
<tr>
<td>Cost Estimators</td>
<td>17.8%</td>
<td>112</td>
<td>8.8%</td>
<td>$60,050</td>
</tr>
<tr>
<td>Construction Managers</td>
<td>6.7%</td>
<td>737</td>
<td>4.8%</td>
<td>$85,630</td>
</tr>
</tbody>
</table>


**BARRIERS TO NTO ENTRY**

The under-representation of female workers in certain occupations continues to limit access to career pathways of high-skill, high-paying jobs.

One potential barrier to equal opportunity is job expectations. While all individuals can choose among numerous occupations, many workers make this decision based on traditional or established choices, expectations, thoughts, and/or behaviors. These influences can be enough to steer job seekers towards certain occupations and away from others. A woman may be unwilling to take a construction job, for example, because she feels isolated and unable to develop friendships at work or, in some cases, because she fears sexual harassment.\(^2\)

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Two primary categories of barriers to NTO entry for women include:

**WORKPLACE- AND CAREER-RELATED BARRIERS.**
These barriers relate to the characteristics and perceptions of certain occupations that make women less inclined to enter these fields. They include:

- **Bias Communicated through Career Materials, Mechanisms, and Practices.**
  Mechanisms such as discrimination, physical segregation and lack of information reduce NTO workers’ expectations of positive workplace experiences and increase their perception of exclusion from workplace support, information, and assistance. ³

- **Perceptions of and Response to an NTO’s Characteristics.**
  An occupation’s characteristics and how individuals perceive or respond to those characteristics have been shown to be a barrier to entering NTOs.⁴ Long working hours, extended periods of travel, and job insecurity are examples of characteristics that may serve as barriers to NTO entry.⁵ Gender role orientation, employment inequities, ideas about masculinity, and family responsibilities are examples of factors that shape how individuals perceive occupations.⁶

- **Lack of Supportive Services.**
  A barrier primarily specific to women, there is a lack of supportive services/benefits in NTOs that would allow women to both raise a family and have a career. These barriers include lack of child care subsidies/programs, maternity leave, and flexible working hours.⁷ While the absence of these benefits impacts a father’s ability to enter an occupation, this type of barrier seems to affect mothers’ career choices more so than fathers.⁸

**EDUCATION-RELATED BARRIERS.**
These barriers relate to the issues women face in K-12 and postsecondary education programs that form the basis for entry into NTOs, particularly those in the science, technology, engineering, or mathematics (STEM) fields. They include:

- **Access to and Participation in STEM Education.**
  STEM education access and participation varies dramatically from individual to individual irrespective of gender. However, the literature found that differences in access to and participation in STEM education may be systematically affecting women and minorities’ ability to enter NTO occupations. According to one study, not only are women underrepresented in the population of initial enrollees, but women students also drop out more frequently than the general population.⁹ Several studies show that women, typically disproportionately underrepresented in STEM majors, suffer significantly lower graduation rates due to a wide number of problems related to suboptimal curricula and instructional styles.

- **Biased Curriculum Structure and Instructional Attitudes.**
  Curricula and instructional attitudes have the power to discourage completion of educational programs essential for entry into particular NTO fields. Examples of this include the creation of feelings of isolation,¹⁰ and imposition of gender roles and expectations onto the students.¹¹ A qualitative study examining the attitudes of women in undergraduate STEM programs arrived at several particularly pertinent conclusions regarding this barrier to NTO entry.¹² Through several rounds of classroom observations, instructors and curricula established the content material as a “male domain,” using masculine forms of communication and the cultivating an environment of male dominance. The same study identifies that this curricula/instructional style contributed to female students’ sense of isolation and feelings of being out-of-place.

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⁸ Ibid.
Stereotype Threat.
The risk of realizing a negative stereotype associated with one’s group has been shown to negatively affect the academic performance of women as well as their motivation to improve.13

Lack of Self-Efficacy.
Confidence in one’s ability to successfully achieve a certain goal or perform a specific task influences both academic performance and career decision making.14

POLICY TOOLS AND STRATEGIES AVAILABLE
Strategies for reducing barriers to NTO entry offer a promising starting point for creating equal access to opportunities provided by employment in NTOs. This includes a host of positive outcomes including: economic self-sufficiency, higher wages, improved benefits, broader job opportunities and advancement potential, and job satisfaction.

Strategies that address workplace/career-related barriers include:

Female-targeted apprenticeship/pre-apprenticeship programs.
Apprenticeship programs provide paid on-the-job learning generally resulting in a nationally recognized credential. Apprenticeships offer job seekers employment opportunities in high wage, high skilled occupations and are almost entirely in male-dominated industries. Some apprenticeship and pre-apprenticeship programs serve females exclusively. These programs facilitate female participation by creating a female peer network and by providing access to supportive services, such as childcare and/or transportation.15 Pre-apprenticeships provide exposure to a variety of high skill, high wage careers and prepare female participants for apprenticeships.

Institutional Change in NTOs.
Institutional change involves reshaping organizational structure and policy within companies to create a less imbalanced environment for NTO populations. These institutional changes in NTOs address biased career mechanisms and practices.

Targeted recruitment practices and materials are designed to correct inaccurate perceptions of NTOs, mitigate the inhibitions of NTO populations regarding these fields, and highlight the benefits of NTOs. Targeted recruitment practices tailored specifically to women seek to overcome the barriers imposed by perceptions about NTOs.

Family-Friendly Policies and Supportive Practices.
Family Supportive Practices – such as subsidized child care, maternity leave, and elder care – are designed to enable parents to participate in training programs and the workforce. These policies tend to benefit women who more often are the primary caregivers for their parents and their children. Such practices address negative training/occupational characteristics such as inflexible work schedules and promotion practices that discourage mothers from entering and/or staying in an NTO due to competing family demands.

Professional Development for Career Counselors.
Strategies associated with professional development for career counselors are designed to fight the biased career materials, mechanisms, and practices that are part of some career counseling programs.16 Internal and external barriers – such as early gender-role orientation, employment inequities, and family responsibilities – can complicate and restrict a woman’s career choice and advancement. Career counselors who lack knowledge and sensitivity towards these issues will not be fully equipped to assist women in their career choices, and may be leading them away from NTO fields.17 Career counseling programs that focus on several key areas can help women find ways in which they feel more comfortable and confident exploring NTO options.18

17 Ibid.
Professional Mentoring Programs.
Formal mentoring programs in the workplace are a strategy that seeks to help members of NTO populations overcome barriers related to biased career materials, practices and mechanisms. New hires from NTO populations in NTOs are given a mentor, often with the same gender as the mentee, to guide their career development, and provide support in miscellaneous ways. Mentors are meant to combat sexist, and otherwise hostile work environments, fight the isolation often reported in NTOs, and give the mentee a sense of direction in the workplace.19

Strategies that address education-related barriers include:

Supplemental Education Programs.
Supplemental education programs encompass a common approach to address the barriers of self-efficacy, stereotype threat, and lack of access to and inadequate participation in STEM courses and careers. Supplemental education programs typically involve workshops, summer camps, conferences, and after-school and summer programs (often STEM-specific).

Curriculum Development.
When not properly implemented and/or containing biases, curriculum can have an adverse effect on a disadvantaged group’s propensity to enter certain NTOs.20 As such, curricula play a critical role in shaping students’ choice of postgraduate occupation. These strategies aim to alter curricula within an educational program to create a more favorable classroom environment for women in STEM programs, in post-secondary21 and in primary22 settings alike.

Student Mentoring Programs.
Academic barriers to NTOs may include the effects of a chilly academic climate on a targeted population. The objective of student mentoring programs is to assist students in improving their academic performance by creating an environment that is welcoming and supportive, and that increases retention and graduation rates in STEM-related disciplines.

Professional Development for Educators.
These strategies address biases associated with instructional attitudes such as stereotypical gender role bias and reinforcement, among others,23 by improving the professional development of educators. Professional development programs seek to alter the way teachers teach students STEM subjects to be more cognizant of the needs and values of women. These programs target the behaviors and instructional styles of educators at various levels of the educational system.

Self-Affirmation Techniques.
Self-affirmation techniques seek to overcome such barriers as low self-confidence in ability to perform and/or anxiety about performing in specific areas, the gender typing of careers in specific fields, stereotype threat, low expectations about career satisfaction, and lack of support in pursuing an NTO career. Research shows that individuals’ confidence in their ability to perform influences their performance as well as the career decisions they make.24,25

CONCLUSION
This policy brief has discussed the wide variety of barriers that females face to entering NTOs, the policy significance of these barriers, and the strategies that could be used to address these barriers. These strategies merit further research on their effectiveness and offer promising starts for pilot projects and evaluations. As such, IMPAQ will develop a program demonstration to explore the effectiveness of a select strategy, further contributing to this literature. Findings from that research will be presented in future policy/issue briefs.

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