Building Female Leadership in STEMM Disciplines in Higher Education
The Myth of the Pipeline

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“...the trend towards greater gender equality in the workforce and in top-management is consistent with and supported by powerful logic. It is not a case of a greater ability of one gender versus the other but that a more diverse group makes for better decision making and corporate performance. The speed with which change is embraced will prove to be the most important and challenging variable.”

“...CEOs who are not promoting diversity are not acting in the interests of their companies or shareholders and should be held accountable.”

Source: Credit Suisse Research Institute, September 2014. The CS Gender 3000: Women in Senior Management
GLOBAL CONTEXT

Advanced economies transitioning to knowledge economies

Top performing global economies derive >30% of GDP through knowledge-based economy

NATIONAL CONTEXT

Historical reliance on resource-based economy <5% economy derived through knowledge

Requires an ‘innovation system’ collaboration between industry, government and academia to develop a knowledge economy
Australia: The transition from the old economy to the new economy is not a choice

- Five million jobs - high probability of being replaced by 2035 – further 18%
  medium probability of being eliminated.

- Jobs with low levels of social interaction, creativity, mobility and dexterity are more likely to be replaced by automation.

- Two million new jobs by 2025 and 65-75% will hold a post-school qualification and 1 in 3 new jobs will be for professionals.

- Future skills education must be around the creative application of technology to solving problems and a focus on innovation and entrepreneurship skillset.

Committee for Economic Development Australia June 2015: Australia’s Future Workforce
Gender disparity in the natural and physical sciences at the higher academic levels

Source: Higher Education Research Data Collection 2012, Department of Education; Office of the Chief Scientist, Australia.
STEM women comprise more than 50% of science PhD graduates and early career researchers, but just 17% of senior academics in Australian universities and research institutes.

Less than 1 in 5 professorial positions in science are occupied by women.

The loss of so many female scientists is a significant waste of expertise, talent and investment, and this impacts our nation’s scientific performance and productivity.

THE PIPELINE MYTH: THE US PERSPECTIVE

• The pipeline myth is the persistent idea that there are too few women qualified (e.g., degree holding) for leadership positions.

• The data indicate that there are more than enough qualified women to fill available leadership positions. In fact, the pipeline is preparing women at a greater rate than it does men.

• Female students have earned half or more of all baccalaureate degrees for the past three decades and of all doctoral degrees for almost a decade.

### Exhibit 4

**Losses along the corporate pipeline**

<table>
<thead>
<tr>
<th>Country</th>
<th>University graduates</th>
<th>Entry-level professionals</th>
<th>Mid-to-senior management</th>
<th>Executive committee</th>
<th>CEO</th>
<th>Board</th>
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<td>55</td>
<td>21</td>
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<td>India</td>
<td>42</td>
<td>29</td>
<td>9</td>
<td>3</td>
<td>&lt;1</td>
<td>5</td>
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<td>Japan</td>
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<td>45</td>
<td>11</td>
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<td>&lt;1</td>
<td>2</td>
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<tr>
<td>S. Korea</td>
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<td>&lt;1</td>
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<tr>
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<tr>
<td><strong>Australia</strong></td>
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<td>Hong Kong</td>
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<td>11</td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>

1 Estimates

SOURCE: McKinsey proprietary database, 2011; government publications; literature search
The Need for a Greater Focus on the Leaky Pipeline in STEMM Careers
A World of Analysis of the Low Retention Rates of Women in SET Fields

Women in Science, Engineering and Technology Development 2000


Report from the European Technology Assessment Network Report 2000

Wenneras C and Wold A, Nepotism and sexism in peer review Nature 387:341-343, 1997 etc...


SET Fair report by Baroness Susan Greenfield, Director of the Royal Institution, 2002

Land of Plenty: Report of the Congressional Commission on the Advancement of
passage through a labyrinth is not simple or direct, but requires persistence, awareness of one’s progress, and a careful analysis of the puzzles that lie ahead.

For women who aspire to top leadership, routes exist but are full of twists and turns, both unexpected and expected.

Because all labyrinths have a viable route to the center, it is understood that goals are attainable....

‘Women and the labyrinth of leadership’
Navigating the Labryinth
Leadership is Gendered

- A range of studies has shown that people associate women and men with different traits and link men with more of the traits that connote leadership.

- A long history of male domination of leadership roles may have made it difficult to separate the leader associations from the male associations.

‘Women and the labyrinth of leadership’
Leadership is gendered...navigating the labyrinth

- Nonverbal dominance, such as staring at others while speaking to them or pointing at people, is a more damaging behaviour for women than for men.

- Assertive behaviour can reduce a woman's chances of getting a job or advancing in her career.

- Simply disagreeing can sometimes get women into trouble. Men who disagree or otherwise act dominant get away with it more often than women do.

‘Women and the labyrinth of leadership’

Mentorship: Supporting Women Navigate the Labryinth
Impact of Mentorship Programs in Business on Career Progression for High Potential Men and Women

2008 Catalyst Study

> 4,000 men and women graduates from top MBA programs (1996-2007)

- Women were paid $4,600 less in first post MBA job and occupied lower level management positions
- Women had significantly less career satisfaction than men with the same education
- More women than men had mentors

2010 Follow up Study

- Men had received 15% more promotions than women
- Mentorship was a significant predictor of promotion for men – but not for women

*Carter and Silva: Women in Management: Delusions of Progress; HBR 2010*
*Ibarra et al: Why Men Still Get More Promotions than Women HBR 2010*
Are Women Overmentored and Undersponsored?

**Mentor:** Study found that the more senior the mentor the faster the mentees career advances and that women tended to have less senior mentors. Some mentors have more organisational clout and are more able to ‘sponsor’ the mentee within the organisation.

**Mentor:** Those mentors who give insightful and reflective advice may not be the high fliers with the influence to ‘pull’ people up through the system.

**Mentorship and Sponsorship:** Particular form of mentorship which goes beyond giving feedback and advice – where mentor uses influence with senior leadership to advocate for the mentee.

**Mentorship and Sponsorship:** Politically astute public endorsement of mentees capability.

We cannot have confidence that a ‘leaky pipeline’ will work deliver the innovation potential of women in STEMM
If women can’t succeed in the system
....then let’s change the system
Structural factors contributing to a ‘leaky’ pipeline

- **Employment conditions gap**: women may enter research careers at a later stage, are more likely to work on temporary work contracts and on a part time basis
- **Career management gap**: Organisational attitudes to family/work balance

Barriers to career progression within the pipeline

- **Science excellence gap**: ‘Gendered’ system for the evaluation of scientific excellence which may impact on career advancement; lack of participation of women in the setting of research agendas
- **Research productivity gap**: Relationship between team leader positions and productivity.
- **Career management gap**: Lack of leadership role models and mentors in the workplace
Tackling Gender Equality at the Institutional Level: UK: Athena SWAN Charter Principles

- To address gender inequalities requires commitment and action from everyone, at all levels of the organisation
- To tackle the unequal representation of women in science requires changing cultures and attitudes across the organisation
- The absence of diversity at management and policy-making levels has broad implications which the organisation will examine
- The high loss rate of women in science is an urgent concern which the organisation will address
- The system of short-term contracts has particularly negative consequences for the retention and progression of women in science, which the organisation recognises
- There are both personal and structural obstacles to women making the transition from PhD into a sustainable research career

Launched 2005 - based on work of the Athena Project and the Scientific Women’s Academic Network (SWAN), Supported by the Equality Challenge Unit (ECU) and the UKRC
• A recent House of Commons Science and Technology Committee Report *Women in Scientific Careers*, found that the Athena SWAN Charter is the ‘most comprehensive and practical schema to improve academic careers and address gender equity’.

• The Science in Australia Gender Equity (SAGE) initiative aims to harness the Athena AWAN initiative to improve gender equity in Australian science, technology, engineering and mathematics (STEM).
ATHENA SWAN SAGE INITIATIVE PILOT

• Launched on 16 September 2015

• Australia is the first nation outside the UK and Ireland to pilot the Athena SWAN Charter program

• >40 Institutions around Australia are taking part in the SAGE pilot, including the University of Newcastle

• Institutions must demonstrate a solid foundation for eliminating gender bias and developing an inclusive culture that values all staff.
The Next Step: Establishment of the Royal Australian College of STEMM Professionals?

- There is no formal body which has national carriage of what constitutes the professional basis of the STEMM career post the PhD - this limits the visibility of a STEMM career as a profession.

- There are no mechanisms which allow recognition of the technical and leadership competencies or experience for STEMM professionals moving between different industries, agencies and educational sectors - or returning to the workforce.

- Maintaining scientific currency is an individual responsibility – there is no body which supports retraining in new areas, upgrading professional or technical skills etc.
Each generation of young women began by believing that gender discrimination was ‘solved’ in the previous generation and would not touch them...

Gradually however their eyes were opened to the realisation that the playing field is not level after all, and that they had paid a high price both personally and professionally as a result..

Mary-Lou Pardue, MIT cited in Nature 1999