Department for the
Economy
www.economy-ni.gov.uk

WOMEN IN STEM

DRIVING INCLUSIVE GROWTH IN A 10X ECONOMY

WOMEN IN STEM

FOREWORD

Increasing the number of women in STEM is at the heart of the Department for the Economy's Vision for a 10x Economy.

The gender imbalance in the STEM workforce is an increasingly urgent issue, both economically and socially; not just in Northern Ireland, but across the UK and beyond. Research by Matrix and others has demonstrated that if we are to reach our full economic potential we must create an environment that encourages women and girls to study and take up careers in science and technology. In the context of Northern Ireland's post-Covid recovery, we now need to act quickly to ensure we can meet our ambition.

This Action Plan brings forward our proposals and sets out our plans for action. It is informed by and builds on the outstanding work already done by the Matrix panel, which originally identified particular issues around gender imbalance in the manufacturing and engineering workforce in the 2016 AMME report. Matrix then went on to carry out a detailed study of the issue across all STEM sectors, culminating in the 2018 Women in STEM report. The paper also builds on the work already being done by Matrix, as well as a range of other excellent organisations working across NI to raise awareness of the issues we want to tackle.

I am particularly grateful to Dr Bryan Keating CBE and Professor Eileen Harkin-Jones OBE for leading the Women in STEM Steering Group and for the significant work that the whole group has undertaken in codesigning this paper with my department. Their support, insight and experience has been invaluable throughout the process and the fresh thinking and creativity they have brought to the work has been vital.

The main objective of this plan is to show how addressing the under-representation of women in "In Demand STEM Skills" – those science and technology skills which underpin the Vision for a 10x Economy – is critical to achieving our overall ambition.

WOMEN IN STEM

I want to ensure that not only do we have the economic strengths we need to deliver that ambition, but also that we improve opportunities for girls and women in our priority clusters. It is not about 'promoting' STEM to girls – but allowing them to see the possibilities of a STEM based career in a manner which appeals to them and which counters the gender stereotyping which has held girls back in the past. It is about levelling the playing field for those girls who choose to take up and pursue a career in STEM.

This is not going to be a quick fix – we cannot increase the number of women in STEM available to the labour force overnight. This Action Plan addresses that issue head on and, while there is much we can do to improve the situation in the short to medium term, we must hold to the course if NI want a long term sustainable female workforce. If we do, the benefits for our whole society will be enormous.

Gordon Lyons,
Minister for the Economy

WOMEN IN STEM

PREFACE

This Action Plan marks the culmination of a year of work by the Department for the Economy (DfE) and its Women in STEM Steering Group. The Department formed the steering group to develop the recommendations of the 2018 Matrix Women in STEM report. Its remit was not only to support key recommendations from the original report, but to develop and further refine the recommendations with the Department to create this Action Plan with support from Waverley Consulting.

The steering group and the Department have looked at ways to encourage women and girls into STEM careers in line with the Department's "Vision for a 10x Economy". This sets out how we can create an economy that is 10x more innovative, 10x more inclusive, 10x more sustainable, in part through the transformation of our skills system. It means addressing skills imbalances and drive increased participation in the In Demand STEM subjects that will underpin our economic success.

This Action Plan takes the 10x Vision and sets out what is specifically required to address the under-representation of women in STEM and how this will contribute to this economic vision. Encouraging more girls and women to choose In Demand STEM subjects – and developing the skills pipeline to support them – is essential to achieving the 10x ambition. In addition, the steering group has contributed to many other plans and strategies, such as the DfE Skills Strategy, the Department for Communities (DfC) Gender Equality Strategy and the joint DfE/Department of Education (DE) 14-19 Framework. We have been very proactive as a group in contributing to these complementary areas of policy and Women in STEM is now formally recognised in these documents.

We are very grateful for the resilience and continued enthusiasm of the steering group. Their ongoing commitment in collecting and presenting evidence, developing recommendations for action and supporting the aims of the steering group in everything they do has been vital in delivering this Action Plan. We would also like to thank DfE for their commitment to a shared vision of economic prosperity and their understanding that addressing the under-representation of women in STEM is critical to it has been vital to our work.

WOMEN IN STEM

Over the years, we have had the privilege to help shape the skills policy landscape in Northern Ireland through various panels and groups, and it is truly encouraging to see actions already being taken forward so quickly and with such commitment by the Department to deliver on the Women in STEM Action Plan. We look forward to continuing to work with the Department in the coming year, and hope that other departments will share the same sense of urgency and commitment to take action to solve this issue. Together we can ensure that Northern Ireland takes full advantage of all of the benefits that a diverse workforce will bring.

Bryan Keating and Eileen Harkin-Jones
Co-chairs of DfE WiSTEM Steering Group

Emer Murnaghan
Chair NI WISE Hub / DfE WiSTEM Steering Group

WOMEN IN STEM

EXECUTIVE SUMMARY

Introduction

1. Delivering the DfE's Vision for a 10x Economy – an economy that is 10x more innovative, 10x more inclusive, 10x more sustainable – will require transformation in our skills system. It will mean working cohesively across our whole education system to address skills imbalances and drive increased participation in the In Demand STEM subjects that will underpin our economic success.

2. Addressing the under-representation of women in STEM is critical to achieving our ambition. We must fix the significant and persistent shortfall in STEM skills that exists currently and must increase the skills pipeline to ensure that future demand for STEM skills is met. Encouraging more women into In Demand STEM subjects – and developing the skills pipeline to support them – is essential to achieving this.

3. This is not a straightforward task. The number of girls pursuing STEM to the point of employment has not changed since 2008, despite the significant efforts of government, business and schools to encourage them to do so. If the next decade continues as the last did, the number of girls pursuing STEM to the point of employment in Northern Ireland will remain at 21% of the STEM workforce and the gap with the rest of the UK will grow ever wider.

The decline in girls participating in Core STEM between the age of 15 and 18 is around 65% compared to a 6% drop off for boys.

Source: Matrix, 2018 Women in STEM Report

WOMEN IN STEM

4. This Action Plan sets out our response to this challenge. There are four strands of activity:

    • **Strand 1: Deepen our understanding of the women in STEM ecosystem;**

    • **Strand 2: Widening dialogue and sharing knowledge;**

    • **Strand 3: Leading change; and**

    • **Strand 4: Bridging the gap between the skills we have and the skills we need.**

    Our approach is informed by – and contributes to – the 10 cross cutting principles set out in the DfE's Vision for a 10x Economy and the commitments in Skills for a 10x Economy.

> ## The DfE Women in STEM Steering Group's aspiration is
>
> **"To have more girls participating in STEM education and STEM employment and that more STEM employers are fully inclusive and representative of a diverse workforce. Furthermore that by 2030, 30% of all young people moving into STEM are girls."**

Technologies, clusters and In Demand STEM

5. Our approach to increasing women in STEM is informed by this thinking. While the overarching purpose remains to increase the number of women in STEM overall, we will increasingly look to ensure that the enabling technologies and priority clusters set out in the DfE's **Vision for a 10x Economy** are fed by the pipeline of female talent. This is the definition of 'In Demand STEM'.

Principles for action

6. Our Action Plan is informed by our 5 principles for action:

• **We will engage partner organisations across Northern Ireland to ensure we take action together;**

• **We will work with partner organisations across Northern Ireland to review current support activities and identify how to accelerate change;**

• **We will deepen our understanding of when the different cultural and social factors that influence girls' choices begin to shape their decision to stop pursuing STEM;**

• **We will establish dialogue with various parties including employers and employees to understand what drives institutional culture and what needs to change to support women in the workplace; and**

• **We will share experience with governments around the world to learn about causes of women's under representation in STEM and to develop effective policy tools.**

WOMEN IN STEM

STRAND 1: DEEPENING OUR UNDERSTANDING

7.   We believe it will be possible to increase women's representation in In Demand STEM and that there is no ceiling to what we can achieve; but we also recognise that existing policies and interventions have had limited success.

8.   We therefore need to develop a deeper understanding of the 'women in STEM ecosystem[1]' and the systemic nature of the challenge we face in getting more girls and women to join and remain in the In Demand STEM workforce.

9.   We will use the women in STEM ecosystem map to identify gaps in our knowledge, to inform our wider research and to make recommendations for further action.

10.   The key tasks are:

DU1   **Develop a detailed map of the women in STEM ecosystem that identifies the key elements, connections and dynamics between its constituent parts.**

DU2   **Identify the full range of services that currently exist to increase the In Demand STEM workforce and map where they sit in the ecosystem.**

DU3   **Conduct detailed desk research into the known challenges faced by other economies seeking to increase the number of women in STEM.**

DU4   **Develop our knowledge of the influences on girls from 0-5 and through the transition into primary school.**

DU5   **Build a learning network with policy makers internationally.**

DU6   **Prepare a policy insights paper that sets out key lessons and recommendations for further action.**

DU7   **Use the policy insights paper to inform development of the Highly Skilled Workforce work programme required to deliver DfE's *Vision for a 10x Economy* and the Skills Strategy, *Skills for a 10x Economy.***

DU8   **Agree and secure funding for delivery of the policy paper recommendations.**

---

1   Women in STEM Ecosystem – The NI education, skills, employment and socio-economic environment and how it affects girls and women who wish to pursue a career in STEM

STRAND 2: WIDENING DIALOGUE AND SHARING KNOWLEDGE

11. We need to refresh our key messages and approaches to take account of the new strategic context in which NI is operating. We need to ensure that all parts of the women in STEM ecosystem understand that strategic context and what it means for improving the pipeline. We need to secure commitment to a shared approach that reflects DfE's Vision for a 10x Economy and we need to help our partners on the supply side to align their activities to deliver that critical mass. We will:

   - **Develop a strong core message that clearly sets out the new strategic context and the imperative to focus on In Demand STEM skills;**
   - **Engage in dialogue across the network of delivery bodies to share the core message and secure buy-in to it; and**
   - **Refine and adapt the core message in light of (for example) our research findings and the insights we will gain from the learning network of international policy makers.**

12. We will conduct this dialogue using a mix of strategic channels which will include online meetings as well as face to face ones. This will ensure we are able to achieve the breadth and depth of dialogue that we need quickly.

13. NI will not achieve the step change it needs if dialogue is limited to certain parts of the women in STEM ecosystem. We must therefore ensure that dialogue engages the whole of the supply side, particularly those – such as parents and girls themselves – who may have limited awareness of, or interest in, the need to increase the number of women in the In Demand STEM workforce. We must also ensure the widest possible engagement on the demand side.

14. We need to give girls and women the ability and support to access all the opportunities available in STEM. But to truly break down barriers and make progress, the way boys behave towards girls in educational settings and the way men behave towards women in the workplace must become part of the solution. Men must be prepared to contribute actively and positively by mentoring, supporting and encouraging women in STEM roles. We want to increase men's understanding of the specific barriers faced by women and promote the need to increase the number of women in STEM roles as a way to improve the whole economy for everyone, rather than just a gender equality target.

15. We will bring forward proposals on what NI must do to ensure it has the culture and value system it needs to support positive change, learning and evolution.

WOMEN IN STEM

The key tasks required to widen dialogue and share understanding are:

WD1 **Refresh our key messages and approaches to take account of the new strategic context in which NI is operating.**

WD2 **Develop a strong core message and use it to conduct dialogue across a mix of strategic channels.**

WD3 **Engage individuals, groups and organisations on the demand side who have limited awareness of, or interest in, the need to increase the number of women in the In Demand STEM workforce.**

WD4 **Bring forward proposals on what NI must do to ensure it has the culture and value system it needs to support positive change, learning and evolution.**

WD5 **Secure funding and implement collaborative proposals to ensure NI has the culture and value system it needs to support positive change, learning and evolution.**

WOMEN IN STEM

STRAND 3: LEADING CHANGE

16. There is a range of organisations across NI looking at supporting girls and women through the pipeline and into employment. This raises three important issues:

   • **There may be too many organisations – which may result in confusion or crowding out;**
   • **There is no apparent co-ordination of activities across the pipeline or geographically – which may lead to overlaps, inequalities, inefficiencies and sub-optimal outcomes; and**
   • **The organisations are not distributed evenly along the pipeline and there are notable gaps in 0-5 years and after A levels.**

17. More urgently, the existing network of organisations is focussed on the broader definition of STEM that predates DfE's Vision for a 10x Economy and NI's need to focus on In Demand STEM Skills. We therefore require a strategic refocussing of the pipeline to ensure that we can deliver the In Demand STEM Skills we need.

18. We will bring forward proposals to create a new priority channel[2] within the pipeline that is focussed on increasing the volume of In Demand STEM skills.

19. We cannot do this to the exclusion of broader STEM skills and will continue to support them throughout the pipeline to provide the foundation for future growth.

20. This is a substantive change and one that needs to be done quickly. We will draw on the support and expertise of the Women in STEM Steering Group in leading the transition.

21. Success will also require buy-in from suppliers along the pipeline. We will therefore hold a second event with them to lay out the proposed changes and to secure their buy-in.

---

2   Priority channel – prioritisation of In Demand skills for the Northern Ireland Economy

WOMEN IN STEM

12

22. The key tasks are:

    LC1   **Bring organisations together to review existing provision and to determine how to co-design and co-ordinate services to plug existing gaps and to remove existing overlaps.**

    LC2   **Bring forward proposals to create a new priority channel within the pipeline that is focussed on increasing the volume of In Demand STEM skills.**

    LC3   **Continue to support wider STEM skills development through the pipeline to provide the foundation for future growth.**

    LC4   **Draw on the support and expertise of the Women in STEM Steering Group in leading the transition.**

    LC5   **Hold follow up events with providers to lay out the proposed changes and to secure their buy-in.**

WOMEN IN STEM

STRAND 4: BRIDGING THE GAP

23. We can increase the number of women entering the In Demand STEM workforce if we can encourage and support more girls through the pipeline – but we also know that this will not happen quickly. We therefore need to consider how to bridge the gap between the talent we need now and the time it will take us to bring that talent forwards through our education system and the wider women in STEM ecosystem.

24. Upskilling women currently not in STEM careers and those who can be encouraged back into the workplace after a career break is one approach we will pursue but will not be sufficient to bridge the gap in time.

25. Another route set out in DfE's Vision for a 10x Economy through The Importance of Place that we will explore is how to attract international talent. Attracting talent is also a core element of the UK Innovation Strategy and we will begin discussions with Invest NI, with the Office for Talent and with key partners in business to develop and evaluate options for attracting talented women working in STEM to Northern Ireland.

26. The key tasks are:

    BG1 Lead a planning sandpit with Invest NI, the Office for Talent and with key partners in business to explore the potential and options for attracting talented women working in STEM to Northern Ireland.

    BG2 Develop and evaluate key options, including determining resource requirements, partnership arrangements and lead responsibilities of all actors.

    BG3 Finalise and securing funding for the agreed plan.

Working in partnership

27. The women in STEM ecosystem does not exist solely within DfE's purview. DfE will achieve significant improvements through its own actions but delivering the best outcome for the economy and the people of Northern Ireland will require other government departments and strategic allies in the wider public and private sectors to work alongside it. Recognising the particular role of the DE, DfE will work to strengthen its collaboration with complementary work streams. This will be critical for both mapping the ecosystem and developing and implementing the policy interventions we need to facilitate change.

WOMEN IN STEM

28. Our plans are already aligning. DfE's Vision for a 10x Economy provides the strategic context for our approach. DfE's Skills Strategy: Skills for a 10x Economy[3] sets out proposals for the development of a flexible skills system for the next decade. DFC's draft Gender Equality Strategy will highlight the business case for gender equality and diversity within STEM.

29. The day to day work that takes place in schools is perhaps the single most important factor in providing girls with the skills and ambition to take up STEM careers. We will therefore work closely with the DE to develop our shared understanding of the ecosystem and to identify opportunities for a systemic approach to policy that will encourage more girls to stay in STEM. Our partnership with DE will be essential for developing our understanding of the challenges and possible solutions around early years and primary education and for delivery of this Action Plan.

30. Operationally, we are already working with key partners outside government – such as the NI WISE Hub, Sentinus, Odyssey Trust, STEM Learning, The Royal Academy of Engineering, and Diversity Mark NI – to co-ordinate activities. These partnerships will be essential for mapping the ecosystem, for identifying gaps or oversupply in provision and for adjusting and aligning projects to ensure NI's response to the challenge is optimal.

Measuring success

31. DfE's Vision for a 10x Economy sets out our ambition to make a generational change to our economy and to our ways of living. That new ambition needs to be matched by a new approach to how we measure the progress we are making.

32. We want to draw on this approach for Women in STEM and link our progress to 10x. This means that – as we develop the detail under each action in this plan with delivery partners – we will agree and assign targets that align with the indicators being developed for DfE's Vision for a 10x Economy.

---

3   Skills Strategy Consultation: Skills for a 10x Economy

WOMEN IN STEM

INTRODUCTION

Northern Ireland's economic vision is for a '10x Economy'.

Our ambition is for a decade of innovation that will encourage greater collaboration and innovation to deliver a ten times better economy with benefits for all our people.

We will realise this vision by focussing on innovation in areas where we have real strengths and making sure these gains mean something to all businesses, people and places in Northern Ireland.

Overall, we will see a positive impact on our economic, societal and environmental wellbeing.

Delivering DfE's Vision for a 10x Economy – an economy that is 10x more innovative, 10x more inclusive, 10x more sustainable – will require transformation in our skills system. It will mean working cohesively across our whole education system to address skills imbalances and drive increased participation in the In Demand STEM[4] subjects that will underpin our economic success.

Addressing the under-representation of women in STEM is critical to achieving our ambition. We must fix the significant and persistent shortfall in STEM skills that exists currently and must increase the skills pipeline to ensure that future demand for STEM skills is met. Encouraging more women into STEM – and developing the skills pipeline to support them – is essential to achieving this.

This will not be a straightforward task. The 2018 matrix report Women in STEM[5] identified that the under representation of women in STEM is a systemic problem with many contributory factors that may not be easily or quickly addressed. The combined impact of these factors is, however, clear:

- The number of girls studying STEM subjects declines steeply from year 12;
- Only 1 in 6 girls studying STEM subjects at GCSE goes on to enrol in a STEM course in university; and
- Only 1 in 13 girls goes on to employment in a STEM role.

---

4 'In Demand STEM subjects' refers to those STEM subjects of particular strategic importance for NI as it delivers *Vision for a 10x Economy.*

5 https://matrixni.org/wp-content/uploads/2018/05/Women-in-STEM-Report-final-20-may.pdf

WOMEN IN STEM

Northern Ireland is not alone...

This leaky pipeline – the loss of girls and women from STEM courses as they move through school and into higher education and work – is a global phenomenon that has taxed policy makers since the 1970s. Only 35% of STEM students in higher education globally are women[6] and, like NI, the gap between men and women is wider in disciplines such as Engineering and Information and Communications Technology.

Representation in the workforce is similarly low globally, with women accounting for just 29%[7] of those employed in scientific research and development (R&D) across the world.

As in Northern Ireland, the causes appear to be systemic. The factors identified in Women in STEM are, broadly, echoed in numerous research reports from different countries. Perhaps the most commonly cited are:

- General gender stereotyping;
- Lack of visible female role models;
- Few mentors (both teaching and career);
- Family and peer influence;
- Teachers' gender perceptions and limited knowledge of STEM career structures;
- Teachers' confidence in teaching STEM - particularly in the primary setting;
- Stereotypes of women in science – which tend not to be positive or celebratory;
- Low confidence in female equality; and
- Media representations of women.

Given the many factors – and the significance of many subjective, even intangible influences on girls' choices – it is perhaps not surprising that there is no magic bullet to increase participation of women in STEM. A 2018 review of the effectiveness of STEM related interventions[8] found there to be no consensus about which interventions are successful in raising interest in STEM or persistence in STEM education. It also found that, while some potentially effective interventions can be identified, there is still insufficient understanding of what causes talented and initially motivated STEM students to drop out of STEM education.

---

6   Unesco (2017) Cracking the code: girls' and women's education in science, technology, engineering and mathematics (STEM) https://unesdoc.unesco.org/ark:/48223/pf0000253479

7   Catalyst Research (2020) Women in Science, Technology, Engineering and Mathematics (STEM) Quick Take https://www.catalyst.org/research/women-in-science-technology-engineering-and-mathematics-stem/

8   Van de Hurk et al (2018) Interventions in education to prevent STEM pipeline leakage, International Journal of Science Education https://www.tandfonline.com/doi/full/10.1080/09500693.2018.1540897

WOMEN IN STEM

But Northern Ireland performs less well than the rest of the UK

A key finding of Women in STEM is that the number of girls pursuing STEM to the point of employment has not changed since 2008, despite the significant efforts of government, business and schools to encourage them to do so. The number of women in the NI STEM workforce remains at 21%[9].

In contrast, the number of women in the UK STEM workforce has increased over the last decade[10] and has risen from 21% of the workforce in 2016 to 24% by 2019.

Based on this level of growth WISE estimate that women will make up over 29% of the UK STEM workforce by 2030[11].

If the next decade continues as the last did, the number of girls pursuing STEM to the point of employment in Northern Ireland will remain at 21% of the STEM workforce and the gap with the rest of the UK will grow ever wider.

We are beginning to make gains

There are already many very good organisations, businesses and outreach initiatives actively working to attract and retain more girls and women to In Demand STEM education and employment. These include:

- The NI WISE Hub, which brings together STEM employers and STEM organisations. The Hub shares resources, best practice and creates networking events to support all members to accelerate the growth of the number of women and girls in STEM

- Women Role Models. 78 women role models have been signed up for the NI WISE Hub. Around one quarter are already active, carrying out a number of engagements each year. The NI STEM Ambassador Hub has 640 active women ambassadors, over half of whom are under 35

- Diversity Mark NI which awards accreditation to companies following an assessment process which ensures they have reached the required standard of commitment to advancing Diversity and Inclusion. 40% of signatories are from STEM sectors

- STEM Learning: STEM Learning delivers continuous professional development (CPD) to primary and secondary teachers across the UK (including NI) via funding from UK Research and Innovation (UKRI) and industry. 70% of this funding is targeted towards primary school/primary

- Teachers - is a key area of focus for this Action Plan.

---

9   nomis, official labour market statistics, Office for National Statistics
10 Wise Campaign https://www.wisecampaign.org.uk/statistics/2018-workforce-statistics/
11 https://www.wisecampaign.org.uk

WOMEN IN STEM

Getting it right: Emer Murnaghan OBE – Graham Construction

Emer Murnaghan is Innovation Director Civil Engineering at contractor Graham. She joined Graham Construction in 2011 to develop and implement a business improvement programme for the group. More recently she has helped evolve and communicate a sustainable business strategy for the £850 million group; she is currently developing the innovation strategy for civil engineering and now reports directly to the managing director of GRAHAM Civils.

She is a chartered civil engineer, a chartered environmentalist, a chartered member of the Institute of Water and a Fellow of the Institution of Engineers of Ireland. In June 2015 Emer was awarded the OBE for services to civil engineering and further education in Northern Ireland. She is a trustee and one of the Vice Presidents of the Institution of Civil Engineers and an ambassador for WISE (Women In Science & Engineering), acting as role model and working to promote gender balance at the highest levels within the UK.

Emer is clear on how diversity in the STEM workplace encourages innovation, drives productivity and improves profit:

"Traditionally the construction industry is characterised by a closed mindset at all levels, not being prepared to challenge what we do and why we do it. I'm not suggesting we throw caution to the wind, but we should be considering whether things can be done differently, and who else we could involve in order to progress new ideas.

"At every stage of the programme delivery cycle we need to ask: what could we do to improve? This challenge and review process applies as much to those who procure work as it does to those who deliver the projects. We each have a part to play.

"We should seek out diverse thinkers to disrupt our business as usual mindset, otherwise we are really missing opportunities to innovate. Research shows that recruiting people from different backgrounds, different lived experiences and different cognitive ability creates a really rich diverse mix that encourages incubation of new ideas.

"We also have to get used to accepting things can and will go wrong. We need to own our mistakes, not ignore or gloss over them. Instead, if we have a "fail fast" mentality, when something goes wrong, we should pause and analyse the reasons, understanding the WHY? We should use this new learning to improve our processes and/or behaviours to avoid repeating errors. We want to focus on getting it right the next time. It's that simple!"

WOMEN IN STEM

But we must do more

Despite these efforts, the participation levels of girls and women in In Demand STEM is not improving and we must do more.

This Action Plan therefore sets out what we will do to:

• Deepen our understanding of why we have been unable to increase the number of girls pursuing In Demand STEM to the point of employment;

• Widen dialogue and share knowledge across Northern Ireland about what needs to be done to improve the current situation;

• Lead change to ensure we have a robust and efficient STEM skills pipeline; and

• Bridge the talent gap between the In Demand STEM skills we currently have and the In Demand STEM skills we need to deliver the DfE's Vision for a 10x Economy.

And we must take a cross-cutting approach

The DfE's Vision for a 10x Economy sets out 10 guiding principles which underpin its vision:

1. Address those issues that really matter and will make a lasting and positive difference in peoples' lives;

2. Deliver positive economic, environmental and societal outcomes;

3. Support a greener, sustainable economy;

4. Provide a fairer distribution of opportunities for all our people;

5. Inspire the future generations to thrive;

6. Position NI amongst the most competitive small advanced economies in the world;

7. Focus on increasing innovation in high value-added areas and priority clusters resulting in higher wages;

8. Deliver improved outcomes for all including better jobs with better wages for all our people, with a more flexible work environment and a better overall quality of life;

9. Position NI as an optimum place to work, invest, live and visit; and

10. Shaped by public sector innovation and co-design with partnership working at its heart.

This Action Plan is informed by these cross-cutting principles and our programme for action contributes to all 10 of them.

WOMEN IN STEM

This means that, as well as working with partners across government and beyond to deliver the specific tasks set out in this Action Plan[12], we will also work closely with colleagues who are developing the related policies and approaches NI needs to achieve greater collaboration and innovation and to deliver the DfE's Vision for a 10x Economy. We will ensure that our approach informs – and is informed by – the development of new policies and that the lessons we learn contribute to wider policy implementation.

WOMEN IN STEM

12 See section 5, *Working in Partnership*

ENABLING TECHNOLOGIES AND PRIORITY CLUSTERS

In the past we have suffered from a 'fear of focus' that has prevented us realising our potential. We recognise that small advanced economies such as ours need to deliberately develop key and unique strengths to give us a competitive advantage.

We must also position ourselves to respond to the global shifts and megatrends which cut across the economy, society and the environment. These include digital advances, increasing connectedness, an ageing population and climate change. Other small advanced economies are responding to these same challenges and we must prepare to take advantage of the opportunities they present.

Recognising this, the vision set out in the DfE's Vision for a 10x Economy focuses on the areas of strength where Northern Ireland can be a global leader within the next decade and defines Northern Ireland's priority areas of focus.

The DfE's Vision for a 10x Economy defines a range of enabling technologies that will be the foundation of future growth:

WOMEN IN STEM
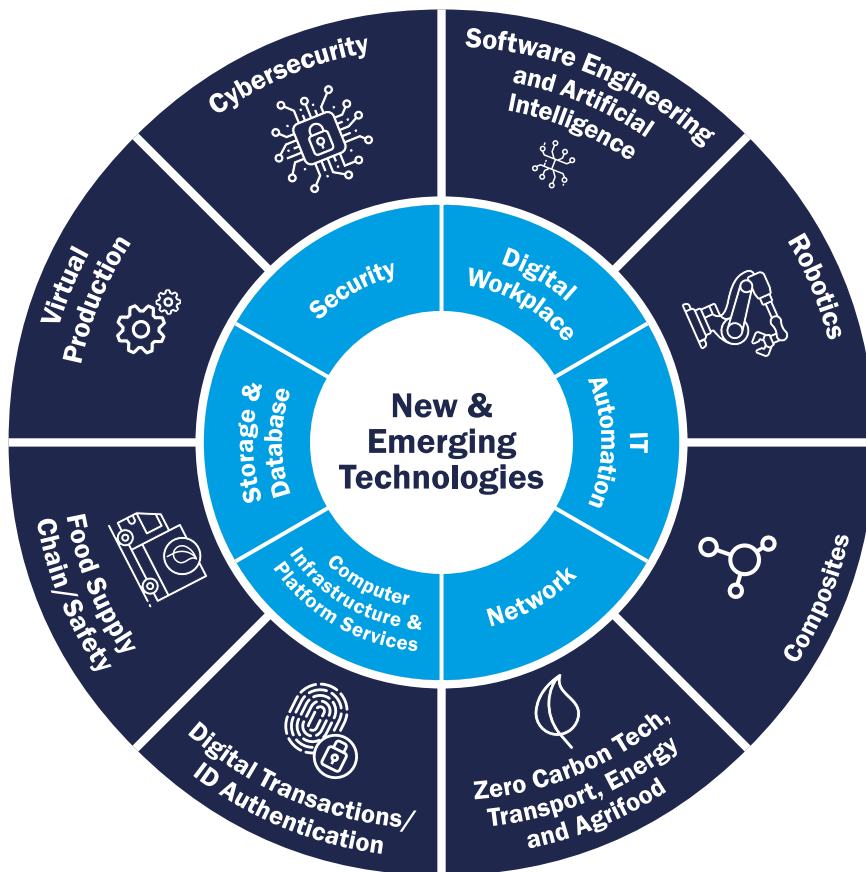
These technologies can be developed individually on their own, or – with greater impact on our economic vision – in combination. They generate increased innovation, higher levels of competitiveness and help businesses diversify into new markets.

Their impact on the economy is most significant when they are supported to come together to form 'clusters' of economic activity. The DfE's Vision for a 10x Economy sets out a number of clusters where NI has the potential to be world class, creating a unique proposition for NI and developing global leadership capabilities.

Our five priority clusters relate to areas where we have seen the emergence of significant capability and capacity with the potential to drive the economy forward. Whilst these clusters may change over time, our commitment to tightening an economic strategy from broad sectors to strong or emerging specialisations will remain.
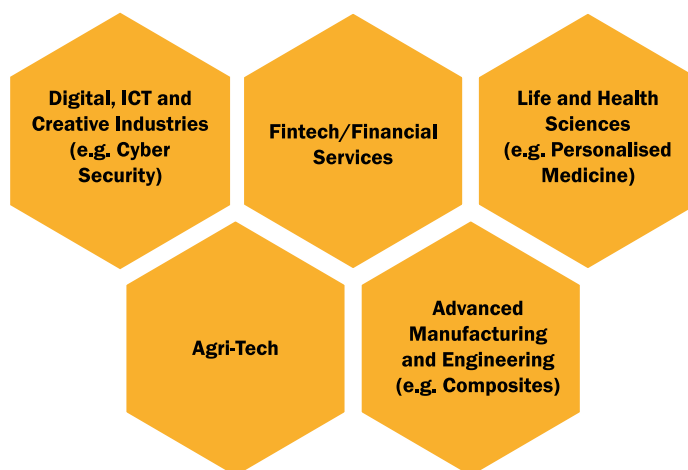
Technologies, clusters and In Demand STEM

Our approach to increasing women in STEM is informed by this thinking. While the overarching purpose remains to increase the number of women in STEM overall, we will increasingly look to ensure that the enabling technologies and priority clusters set out in the DfE's Vision for a 10x Economy are fed by the pipeline of female talent. This is the definition of 'In Demand STEM'.

This means we will identify the emerging skills requirements of strategic sectors – such as those set out in our new Energy Strategy – and key growth areas such as the green economy and we will ensure our education and training system supports development of the agile workforce we will need to underpin the clusters approach.

We will seek, too, to capitalise on the 'technology dividend' caused by long term challenges – such as COVID-19 and the race to net zero – increasing young people's interest in a career in science research[13].

---

13 https://www.britishscienceassociation.org/blog/young-people-are-more-interested-in-a-scientific-career-as-a-result-of-covid-19

Getting it right: DfE Cyber Security Pilot

In Northern Ireland, demand for cyber security workers far outstrips supply. So the DfE trialled a one year pilot scheme, the NI Cyber Gateway Aptitude Programme, aimed at matching potential job applicants to employers, through a process that complemented traditional hiring methods.

They understood that relying on the annual pool of graduate or higher education qualified candidates to meet the demand is not enough. So the pilot used an innovative online platform that allowed applicants to obtain and then test their own aptitude for cyber security roles through a series of learning modules and also allowed employers to advertise vacancies for free.

To be eligible for the programme, applicants didn't need experience in a tech or cyber role but had to be aged 16 or over, live in Northern Ireland and have a GCSE or equivalent in Maths and English. It was designed to particularly encourage underrepresented groups including people with non IT qualifications, the neurodiverse, older workers and women returners.

The intention was to find potential candidates who had the aptitude to perform entry-level jobs but did not have the qualifications ordinarily needed to start a career in cyber. Barriers to gaining a cyber qualification include, a lack of formal qualifications, full-time work or caring commitments, prohibitive costs of certifications etc. This pilot was designed to eliminate those barriers and give candidates the opportunity to gain and showcase their capability. By providing evidence of a candidate's practical skills and abilities, it gave employers confidence in the applicants' technical aptitude and potential for a career in cyber security.

Because the process was free, online and could be accessed at any time, the programme has proved extremely popular with its target audiences. For instance over a third of candidates are female. This is well above the average in the global and UK cyber workforce (11% and 8% respectively)[14].

Eoin McFadden, Head of Innovation Strategy at DfE said: "We were really struck by the high proportion of women who applied for this programme – we had originally intended simply to make it as easy as possible for anyone to apply, but the proportion of women applicants is far higher than expected and the quality has been exceptional.

"We hope to use this model in future programmes so that we can continue to encourage maximum uptake from women. Cyber is a fast growing sector in Northern Ireland and the jobs are well paid and interesting, so we want to break down barriers to entry and encourage applicants from all backgrounds to consider a career in Cyber."

WOMEN IN STEM

14 Solving the gender imbalance in cyber

NORTHERN IRELAND'S LEAKY PIPELINE

Like many other developed countries, Northern Ireland's young people become increasingly disengaged from STEM resulting in reduced enrolments in STEM subjects at various levels of the education pathway.

The leaky STEM pipeline is a well-known illustrative model used to demonstrate the points in STEM education where girls drop out of the system. We see evidence of this persistent leaky pipeline from the early years of primary school and continuing throughout post-primary, further education colleges and universities. The natural consequence is a reducing flow, at all levels, of those who are qualified in STEM subjects into our workforce.

For girls in NI, the transition from GCSE to A level Core STEM is particularly important in terms of not taking STEM subjects further (Figure 1).

Figure 1: The level of participation of girls and women in Core STEM at different stages of education
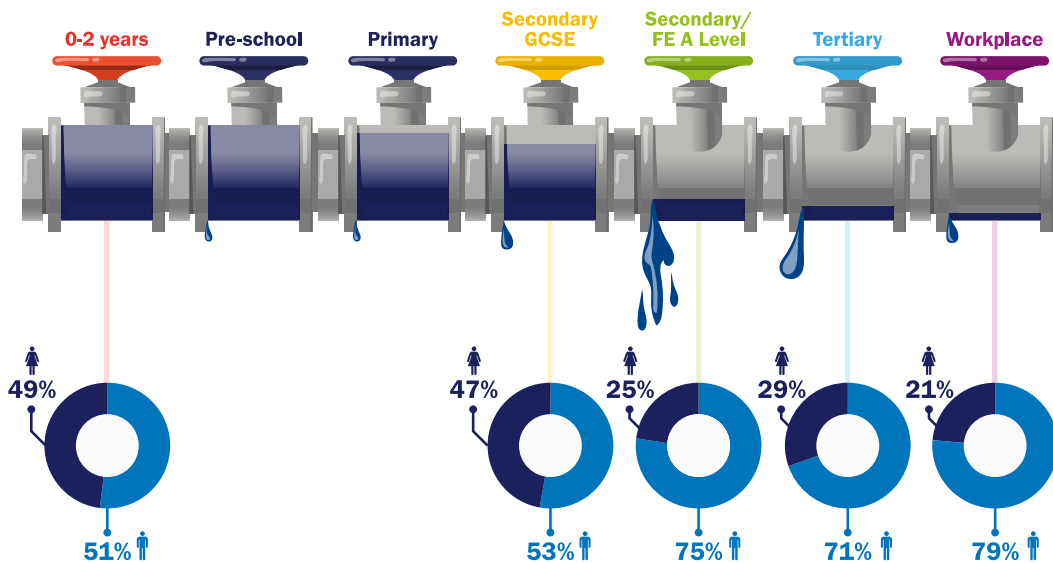
The proportion of girls studying Core STEM drops most significantly between GCSE and A level falling from 47% of all students at GCSE to 25% at A level (Figure 1). The proportion rises slightly at tertiary level – to 29% – due to a reduction in the number of boys continuing with STEM but falls again to 21% in the workplace.

WOMEN IN STEM

The reasons why this happens in Northern Ireland are set out in Women in STEM and match the experience of other nations around the globe:

- Stereotyped ideas of gender roles;
- Lack of confidence;
- Lack of visible female role models;
- Few mentors (both teaching and career);
- Family and peer influence; and
- Media representations of women.

As noted in Section 1, we are already making significant progress in improving visibility of female role models but we must recognise the challenges of addressing some of the deeper cultural issues and retain our focus on them.

A matter of timing

We need to fix Northern Ireland's pipeline quickly - but we also need to recognise that, once fixed, it will take time before we see an improvement in the number of women entering STEM. An immediate uplift in the number of girls continuing with STEM subjects to A level and through tertiary education to employment will have no impact on the recorded number entering the workplace until the mid 2020s. Given the systemic nature of challenge facing us, we know that achieving that uplift will not happen overnight.

The deeper challenge posed by the pipeline is to understand when and why girls make their choice to stop studying STEM after GCSE and to develop policies and interventions that are focussed on that point. Building this understanding is key to making effective policy choices and is the focus of Strand 1 of this Plan.

Men in STEM

The focus of this project is increasing the number of women in STEM – but as the situational analysis indicates, increasing the number of men in STEM will also have a positive effect on Northern Ireland's capacity to deliver the DfE's Vision for a 10x Economy.

In particular, addressing the loss of boys between A level and tertiary education (Figure 2) is likely to have a significant impact on our ability to deliver our vision.

WOMEN IN STEM

Figure 2: The level of participation of boys and men in STEM at different stages of education
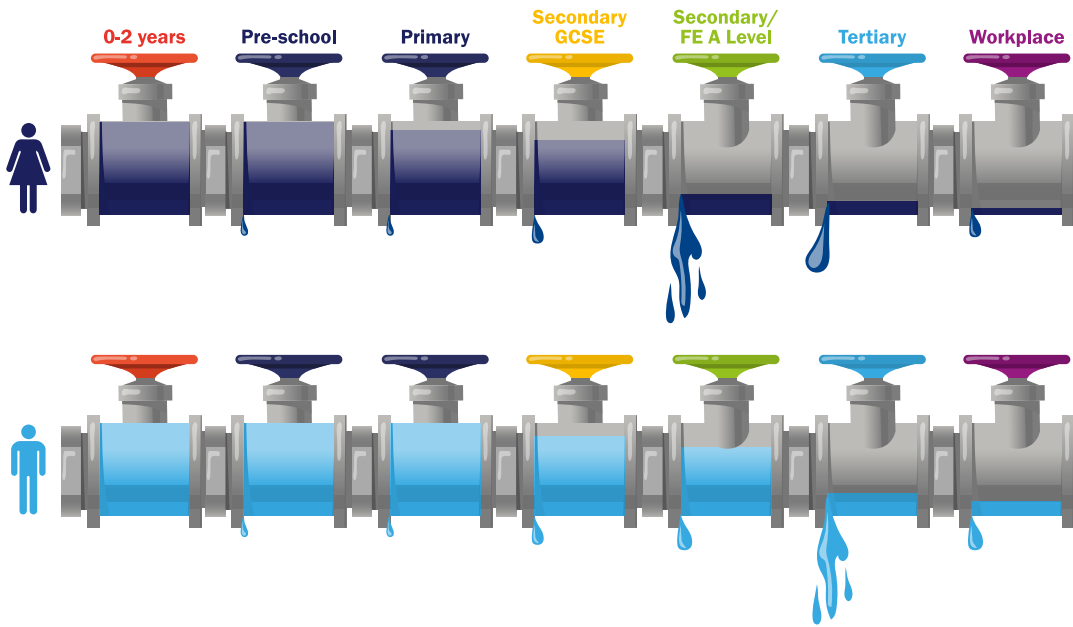
Fixing this part of the pipeline is outside the scope of this Action Plan but we will work closely with that part of government that takes responsibility for doing so to share experience and to collaborate on a holistic approach that increases the opportunities for both women and men.

WOMEN IN STEM

Getting it right: WOMEN'STEC

WOMEN'STEC is the largest quality provider of training for women in non-traditional skills in Northern Ireland. Some of the skills they offer include joinery, furniture making, plumbing, painting and decorating, electrics, wall and floor tiling, horticulture, and Information Technology.

They offer courses to women and girls covering a range of training opportunities in non-traditional skills. As well as this they also offer personal development activities, assistance with employment such as CV writing and interview preparation and a number of evening classes for those who simply want to learn new skills.

WOMEN'STEC is not just about training – they also aim to empower students who may be lacking confidence, are socially excluded or who have a number of barriers to training and education.

In September 2019, WOMEN'STEC launched a new project aimed at bringing women into industries where they've been traditionally underrepresented.

The #NotJustForBoys programme is supported by the Construction Industry Training Board NI, The Housing Executive, Gilbert-Ash Ltd, JP Corry, BBC Children in Need and the Urban Villages Initiative. It offers girls of all ages support to access work experience, work placements and apprenticeships, challenging misconceptions and encouraging women to consider wider career choices. Girls are able to explore and upskill in areas such as electrics, plumbing, carpentry, tiling, DIY, and painting and decorating.

Chief Executive, Lynn Carvill said, "To date we have in excess of 400 school girls who have participated on various aspects of the #NotJustForBoys programme. They have taken part in summer schemes, DIY sessions, 'Girls in Construction' events, #NotYourAverageCareer talks and site visits amongst other things. This programme can only work with the support of industry, schools and further education colleges and I am pleased to say there is real and growing support from our industry and educational partners. Furthermore, the need for skilled workers within the construction industry has been identified and this programme will raise awareness of the rewarding and well paid jobs available to everyone, including girls."

"Girls are often directed towards traditional career paths such as hair and beauty. The #NotJustForBoys programme will connect girls with a wide range of exciting career pathways, enhancing their lifetime and earning opportunities and simultaneously meet the needs of employers across the wider construction industry."

WOMEN IN STEM

TAKING ACTION

Our goal is to develop an enhanced STEM workforce by attracting and retaining more women.

Women will be more empowered and engaged in the workforce and will enjoy greater career opportunities.

Workplace culture and practices will support them to achieve their ambition and will celebrate their success.

Pathways for women into STEM careers – whether through Further Education, apprenticeships and higher level apprenticeships, Higher Education or upskilling and reskilling – will be highly visible and accessible.

Principles for action

Our goal is simply stated, but we know from the Women in STEM report that achieving it will be complex and will require effort from a wide range of partners across government, business and the education and third sectors. Therefore,

> **We will engage partner organisations across NI to ensure we take action together.**

We know, too, that considerable progress has already been made across NI in raising awareness of the opportunities for girls and women in STEM – but that these activities are not yet having a significant impact on the workforce. We must do more and we must do it quickly. Therefore,

> **We will work with partner organisations across Northern Ireland to review current support activities and identify how to accelerate change.**

We know that we can increase the number of women entering the In Demand STEM workforce if we address the challenges of the leaky pipeline and reduce the catastrophic loss of girls from STEM subjects following GCSEs – but we need to learn more about when and why girls make these choices if we are to meet that challenge. Therefore,

> **We will deepen our understanding of when the different cultural and social factors that influence girls' choices begin to shape their decision to stop pursuing STEM.**

WOMEN IN STEM

We know that we must fix the culture and practices of the workplace – and, indeed, of further and higher education – to ensure that women are listened to and that their needs are understood and respected; but the behaviours and attitudes that make some STEM workplaces uncomfortable for women will be hard to change overnight. Therefore,

> **We will establish dialogue with various parties including employers and employees to understand what drives institutional culture and what needs to change to support women in the workplace.**

And finally, we know that many governments around the world are wrestling with the same challenge to increase the number of women in the STEM workforce. Therefore,

> **We will share experience with governments around the world to learn more about the causes of women's under representation in STEM and to develop effective policy tools.**

Four key areas of action

Our Action Plan has four strands:

- Strand 1: Deepening our understanding of the women in STEM ecosystem;
- Strand 2: Widening dialogue and sharing knowledge;
- Strand 3: Leading change; and
- Strand 4: Bridging the talent gap.

This section describes the rationale, purpose and key tasks for each strand. Target dates for delivery, success measures and required resources are set out in Our Programme for Action.

STRAND 1:

Deepening our understanding of the women in STEM Ecosystem

Figure 1 highlights the key points in the pipeline where girls stop studying STEM subjects – but it doesn't tell us anything about when girls make the choice to stop or how influences and experiences earlier in their life might shape their decisions.

Women in STEM highlights that stereotyped ideas of gender roles develop very early in life. It sets out a range of influences that shape girls' choice to pursue a STEM career - self-confidence, stereotypes, educational environment, the perceived attractiveness of the sector and social factors including peers, parents, the presence of role models and media – and explores their potential interaction and consequences.

The factors identified in the Women in STEM report are common to most economies that are seeking to increase women's representation in the STEM workforce[15]. Representation in the workforce is low globally - accounting for just 29%[16] of those employed in Research and Development across the world – and governments have had limited success in increasing it significantly. This suggests that policy interventions are not targeted in the right place or that they need to be broader and more systemic.

We therefore need to develop a deeper understanding of the 'women in STEM ecosystem' and the systemic nature of the challenge we face in getting more girls and women to join and remain in the STEM workforce in general and the In Demand STEM workforce in particular.

We will use that understanding to expand our preliminary mapping work (Figure 3) and to develop a detailed map of the women in STEM ecosystem that identifies the key elements, connections and dynamics between its constituent parts and that informs current and future policy interventions.

---

15 See, for illustration, Australia's Advancing Women in STEM Strategy and Microsoft's Why Europe's girls aren't studying STEM

16 Catalyst Research (2020) Women in Science, Technology, Engineering and Mathematics (STEM) Quick Take https://www.catalyst.org/research/women-in-science-technology-engineering-and-mathematics-stem/

WOMEN IN STEM

Figure 3: The Women in STEM Ecosystem

Quality assured STEM promotion activities

STEM teachers qualified in appropriate STEM subject

Equal access for all pupils in NI to qualify assured careers education

Athena Swan for students

EARLY YEARS AND PRIMARY
ALL girls leaving Primary School are enthusiastic about STEM and confident about their STEM abilities

SECONDARY
Enjoyment of STEM and confidence levels maintained. High levels of awareness of all career opportunities

FE / APPRENTICESHIPS / HE
Enjoyment of STEM and confidence levels maintained. Fully prepared for entering the workforce and achieving potential

Awareness training for ITT (and via CPD)

Curriculum and resource development to counter stereotypes

Bursaries to encourage more STEM students into primary teacher training

ENHANCED, EMPOWERED & ENGAGED STEM WORKFORCE

RETURNERS AND CAREER CHANGERS
Accessible, quality assured and well publicised routes into STEM

Excellent workplace culture and practices

ITT providers (e.g. St Marys, Stranmillis)

CCEA

Diversity Charter

WISE Ten Steps

Springboard type programme

Department for Education

Department for the Economy

KEY Education   Employment   Intervention   Responsible Body

We will map the whole ecosystem. This means we will not only reflect our growing knowledge of the pipeline through primary and secondary education but also the role of apprenticeships, tertiary education, women returners and career changers in increasing participation.

As part of this approach, we will work with others to address the continuing challenge to create a standardised and systematic approach to data capture, reporting and monitoring that will help us to build a more accurate picture of the progress of girls and women through the STEM ecosystem. Once this is in place, we will seek to expand our knowledge of key points in the pipeline and throughout career pathways and establish mechanisms for data analysis that support future policy making.

WOMEN IN STEM

We will identify the full range of services that currently exist to increase the In Demand STEM workforce and map where they sit in the ecosystem. We will:

- Identify gaps in provision and options for plugging those gaps;
- Identify oversupply and options for managing it;
- Characterise the channels of communication between policy makers, intermediary organisations and delivery bodies and determine their effectiveness; and
- Develop our understanding of the bottlenecks in the ecosystem that may be holding NI back from achieving our goal.

We will learn from the experience of other economies about what works – and what does not – when developing our approach. We will conduct detailed desk research into the known challenges of increasing women in STEM and draw on it as we build our understanding of how the ecosystem operates.

In the initial stage of this workstream, we will focus in particular on developing our knowledge of the influences on girls in the early years. We will conduct a detailed literature review to:

- Understand girls' experience from 0-5 years;
- Assess the scope for intervention in the 0-5 years age range; and
- Identify good practice in reinforcing and sustaining positive experiences through the transition into primary education.

Building on our desk research, we will build a learning network with policy makers internationally to share experiences and build case studies of successful – and unsuccessful – policy interventions.

We will prepare a policy insights paper that sets out the key lessons emerging from this strand of work and our recommendations for further action and strategic programmes to tackle underrepresentation and to increase the number of women in the In Demand STEM workforce. We will use the insights paper to inform development of the talent and skills work programme required to deliver DfE's Vision for a 10x Economy.

WOMEN IN STEM

Key tasks

The key tasks required to deepen our understanding of the women in STEM ecosystem are:

DU1 **Develop a detailed map of the women in STEM ecosystem that identifies the key elements, connections and dynamics between its constituent parts.**

DU2 **Identify the full range of services that currently exist to increase the In Demand STEM workforce and map where they sit in the ecosystem.**

DU3 **Conduct detailed desk research into the known challenges faced by other economies seeking to increase the number of women in STEM.**

DU4 **Develop our knowledge of the influences on girls from 0-5 and through the transition into primary school.**

DU5 **Build a learning network with policy makers internationally.**

DU6 **Prepare a policy insights paper that sets out key lessons and recommendations for further action.**

DU7 **Use the policy insights paper to inform development of the Highly Skilled Workforce work programme required to deliver DfE's Vision for a 10x Economy and the Skills Strategy, Skills for a 10x Economy.**

DU8 **Agree and secure funding for delivery of the policy paper recommendations.**

Target dates for delivery, success measures and required resources are set out in Our Programme for Action.

WOMEN IN STEM

STRAND 2: WIDENING DIALOGUE AND SHARING KNOWLEDGE

The range of stakeholders in the women in STEM ecosystem is wide and includes:

- Girls and women;
- Boys and men;
- Schools, colleges and universities;
- The media;
- Teachers and mentors;
- Parents, families and peers;
- Employers and co-workers;
- Government; and
- Intermediary organisations.

Some stakeholders are already actively involved in conversations about the challenges of increasing the number of women in STEM and some are already making choices and changes that will have an impact.

These choices and changes are not, however, happening at the scale we need to deliver a step change in women's representation in the In Demand STEM skills we need to deliver DfE's Vision for a 10x Economy. We need to build critical mass.

We need to refresh our key messages and approaches to take account of the new strategic context in which NI is operating. We need to ensure that all parts of the women in STEM ecosystem understand that strategic context and what it means for improving the pipeline. We need to secure commitment to a shared approach that reflects DfE's Vision for a 10x Economy and we need to help our partners on the supply side to align their activities to deliver that critical mass.

We need do this quickly. Our approach to the supply side conversation will therefore be efficient and expedient. We will:

- Develop a strong core message that clearly sets out the new strategic context and the imperative to focus on in demand stem skills;
- Engage in dialogue across the network of delivery bodies to share the core message and secure buy-in to it; and
- Refine and adapt the core message in light of (for example) our research findings and the insights we will gain from the learning network of international policy makers.

WOMEN IN STEM

We will conduct this dialogue using a mix of strategic channels and targeted communication activities which will include online meetings as well as face to face ones. This will ensure we are able to achieve the breadth and depth of dialogue that we need quickly.

NI will not achieve the step change it needs if dialogue is limited to certain parts of the women in STEM ecosystem. We must therefore ensure that dialogue engages the whole of the supply side, particularly those – such as parents and girls themselves – who may have limited awareness of, or interest in, the need to increase the number of women in the In Demand STEM workforce.

As well as raising awareness, this strand will help government and the wider supply side to learn how the changing context of the last three years – the urgent climate crisis and the COVID-19 pandemic, for example – have changed girls' interest in STEM.

We must also ensure the widest possible engagement on the demand side. We must ensure our communication efforts are sustained over time and that they are underpinned by a range of online and offline resources that – for example – showcase career pathways and profile role models. Here, we will work with our delivery partners to build on the considerable body of work that has already been done.

We will therefore use this strand of the Action Plan to deepen our understanding of NI's cultural awareness and readiness for change. We will bring forward proposals on what NI must do to ensure it has the culture and value system it needs to support positive change, learning and evolution[17]. These will feed directly into long-term policy and will inform our actions in Strand 3: instigating and co-ordinating change.

Key tasks

The key tasks required to widen dialogue and share understanding are:

WD1 **Refresh our key messages and approaches to take account of the new strategic context in which NI is operating.**

WD2 **Develop a strong core message and use it to conduct dialogue across a mix of strategic channels.**

WD3 **Engage organisations on the demand side who have limited awareness of, or interest in, the need to increase the number of women in the In Demand STEM workforce.**

---

17 Culture comes first: putting culture and values at the centre of public policy, Centre for Public Policy (2017)

WOMEN IN STEM

WD4 **Bring forward proposals on what NI must do to ensure it has the culture and value system it needs to support positive change, learning and evolution.**

WD5 **Secure funding and implement collaborative proposals to ensure NI has the culture and value system it needs to support positive change, learning and evolution.**

Target dates for delivery, success measures and required resources are set out in Our Programme for Action.

WOMEN IN STEM

STRAND 3: LEADING CHANGE

Northern Ireland has made considerable progress since Women in STEM was published and there is now a range of organisations across NI looking at supporting girls and women through the pipeline and into employment (mapped in Figure 4).

The map raises three important issues for our strategic response to the challenge of encouraging more women in to In demand STEM employment, however:

- There may be too many organisations – which may lead to confusion or crowding out;
- There is no apparent co-ordination of activities across the pipeline – which may lead to overlaps, inefficiencies and sub-optimal outcomes; and
- The organisations are not distributed evenly along the pipeline and there are notable gaps in the 0-5 years and after A levels.

Figure 4: Map of support to increase the number of women and girls moving into STEM careers
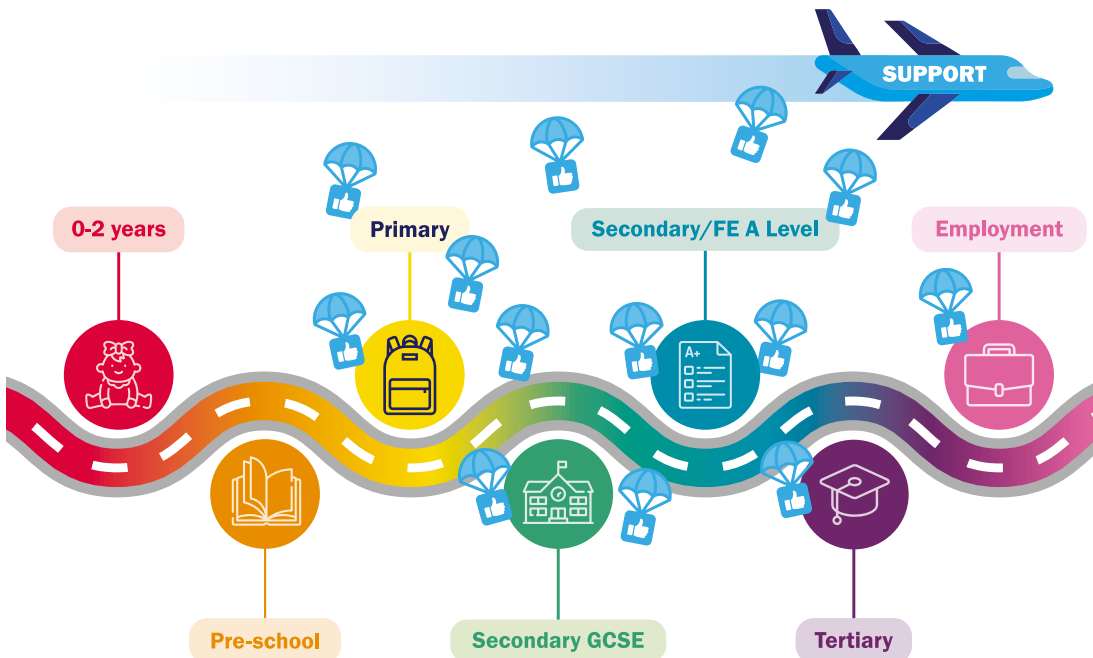
These issues need to be addressed as we move forwards. A critical first step must be to bring organisations together to review existing provision and to determine how to co-ordinate services to plug existing gaps and to remove existing overlaps.

More urgently, the existing network of organisations are focussed on the broader definition of STEM that predates DfE's Vision for a 10x Economy and NI's need to focus on In Demand STEM Skills that support development of the new and emerging technologies and priority clusters we need to deliver our decade of innovation. We therefore require a strategic refocussing of the pipeline to ensure that we can deliver the In Demand STEM Skills we need.

WOMEN IN STEM

We will work with lead organisations in the pipeline – such as the NI Wise Hub, Sentinus, Odyssey Trust, STEM Learning and others – to review the map of existing organisations and to bring forward proposals to create a new priority channel within the pipeline that is focussed on increasing the volume of In Demand STEM skills. The priority channel will become the focus for targeted interventions such as sponsored scholarships, pilot programmes to develop talent in particular STEM disciplines or female business accelerators.

We cannot do this to the exclusion of broader STEM skills and we will continue to support them throughout the pipeline to provide the foundation for future growth – while recognising that we must retain our focus on In Demand STEM skills.

This is a substantive change and one that needs to be done quickly. Our success in delivering it will rely on strong leadership and a managed transition to a twin channel pipeline. We will draw on the support and expertise of the Women in STEM Steering Group in leading the transition.

Success will also require buy-in from suppliers along the pipeline. We will therefore hold a second event with them to lay out the proposed changes and to secure their buy-in.

Key tasks

The key tasks required to lead change are:

LC1   **Bring organisations together to review existing provision and to determine how to co-design and co-ordinate services to plug existing gaps and to remove existing overlaps.**

LC2   **Bring forward proposals to create a new priority channel within the pipeline that is focussed on increasing the volume of In Demand STEM skills.**

LC3   **Continue to support wider STEM skills development through the pipeline to provide the foundation for future growth.**

LC4   **Draw on the support and expertise of the Women in STEM Steering Group in leading the transition.**

LC5   **Hold follow up events with providers to lay out the proposed changes and to secure their buy-in.**

Target dates for delivery, success measures and required resources are set out in Our Programme for Action.

WOMEN IN STEM

STRAND 4: BRIDGING THE TALENT GAP

We know we can increase the number of women entering the In Demand STEM workforce if we can encourage and support more girls through the pipeline.

We also know, however, that this will not happen quickly. Even if we could immediately increase the number of girls who continue studying STEM after GCSE, it would still take up to six years before we would see the full impact of that change in the workforce. The reality is that any significant increase will not happen immediately.

Upskilling women currently not in STEM careers and those who can be encouraged back into the workplace after a career break is another approach we will pursue but it, too, will not be sufficient to bridge the gap in time.

This has two important consequences for NI.

The first is that we must ensure all partners understand that our policies cannot deliver the change we need quickly. That is the systemic nature of the challenge we face.

The second is that we must develop and pursue policies that will deliver long term sustainable change in the supply of In Demand STEM skills. This will require careful policy design that is informed by our growing understanding of the women in STEM ecosystem if we are to transform participation in the In Demand STEM subjects that will underpin our economic success. We must avoid non systemic quick fixes that appear to solve the problem but that take our eye off the true prize.

We need to consider how to bridge the gap between the talent we need now and the time it will take us to bring that talent forwards through our education system and the wider women in STEM ecosystem.

One potential route set out in DfE's Vision for a 10x Economy that we will explore is how to attract international talent. Attracting talent is also a core element of the UK Innovation Strategy[18], launched in July 2021. Pillar 2 of the Strategy – People: We will make the UK the most exciting place for innovation talent – sets out the government's proposals to make the UK a magnet for innovators. These proposals will be co-ordinated by the new Office for Talent to bring talent to the UK. The Innovation Strategy also highlights the critical importance of STEM skills to the innovation process.

18 UK Innovation Strategy: Leading the future by creating it (Department for Business, Energy and Industrial Strategy), July 2021

WOMEN IN STEM

We will begin discussions with Invest NI/Intertrade Ireland, with the Office for Talent and with key partners in business to develop and evaluate options for attracting talented women working in STEM to Northern Ireland. We will ensure this work links to wider efforts to develop women professionally and into management and leadership positions.

Key Tasks

The key tasks required to explore our options for bridging the talent gap are:

BG1   **Lead a planning sandpit with Invest NI, the Office for Talent and with key partners in business to explore the potential and options for attracting talented women working in STEM to Northern Ireland.**

BG2   **Develop and evaluate key options, including determining resource requirements, partnership arrangements and lead responsibilities of all actors.**

BG3   **Finalise and securing funding for the agreed plan.**

BG4   **Implement the plan.**

Target dates for delivery, success measures and required resources are set out in Our Programme for Action.

WOMEN IN STEM

Getting it right: Allstate Northern Ireland

Allstate NI is a subsidiary of the Allstate Corporation, one of the largest property and casualty insurance companies in the United States. Established in 1998, Allstate NI has over 2,400 employees working in technology, data, cybersecurity, and finance.

Allstate has established a culture of diversity and inclusion, ensuring that everyone feels included and their voice matters. It aims to cultivate exceptional corporate governance through commitment to exemplary ethics, integrity, and transparency through its 'Force for Good' strategy.

Allstate employees are the driving force behind this strategy and have formed several Employee Resource Groups [ERGs]. These provide an open forum where employees collaborate to champion causes close to their hearts, positively influencing the workplace environment and supporting the health and wellbeing of all employees. They include:

Embrace - promoting an inclusive work environment for LGBTQ+ Allstate employees.

AllCare - supporting Allstate NI employees with caring responsibilities through peer to peer support and external organisations which offer carer support and advice.

Ausome - encouraging companywide awareness of Autism Spectrum Awareness (ASD) and helping employees openly discuss key concerns and issues, seek support from fellow colleagues and be sign-posted to available resources.

Women in Technology at Allstate (WITA) - representing women and advocated by men interested in helping to advance women in the field.

Mental Health First Aiders - promoting good mental health in the workplace through a culture of openness and honesty.

AllGreen - aimed at reduce our carbon footprint, educating employees on environmental issues, and supporting environmental and biodiversity initiatives.

Allstate works with a range of external organisations and charities. In 2017, they partnered with Women in Business NI to launch the Diversity Charter Mark, a NI-wide initiative addressing and supporting the diversity agenda. Allstate NI was the first company in NI to be awarded Diversity Mark NI's Silver Charter Mark Status.

In 2021, Allstate partnered with Women's Aid to help eliminate domestic violence by providing technical support, fundraising and leadership mentoring services. Through this new partnership, Allstate and Women's Aid will collaborate to challenge inequality at a corporate level, to end domestic violence and foster a society where women can live and work without the fear of violence or discrimination.

WOMEN IN STEM

WORKING IN PARTNERSHIP

The women in STEM ecosystem does not exist solely within DfE's purview. DfE will achieve significant improvements through its own actions but delivering the best outcome for the economy and the people of Northern Ireland will require other government departments and strategic allies in the wider public and private sectors to work alongside it. This will be key for both mapping the ecosystem and developing and implementing the policy interventions we need to facilitate change.

Our plans are already aligning. DfE's Vision for a 10x Economy provides the strategic context for our approach. DfE's Skills Strategy: Skills for a 10x Economy[19] sets out proposals for the development of a flexible skills system for the next decade in line with the economic vision. The DfC's draft Gender Equality Strategy will highlight that women are key to acquiring talent as an asset across the economy; and will also highlight the business case for gender equality and diversity within STEM.

DfE's Vision for a 10x Economy has placed the need to increase women in STEM at the forefront of our economic strategy and we will work with other parts of government – such as Invest NI and the Office for Talent – that can help us deliver.

The day to day work that takes place in schools is perhaps the single most important factor in providing girls with the skills and ambition to take up STEM careers. We will therefore work closely with the DE to develop our shared understanding of the women in STEM ecosystem and to identify opportunities for a systemic approach to policy that will encourage more girls to stay in STEM.

Our partnership with DE will be essential for developing our understanding of the challenges and possible solutions around early years and primary education and for delivery of this Action Plan. We will therefore seek DE's early involvement in Strand 1 and will explore how we can continue to contribute our emerging insights to DE's Independent Review of Education which is due to launch soon.

Operationally, we are already working with key partners outside government – such as the NI WISE Hub, Sentinus, Odyssey Trust, STEM Learning, The Royal Academy of Engineering and Diversity Mark NI – to co-ordinate activities. These partnerships will be essential for mapping the ecosystem, for identifying gaps or oversupply in provision and for adjusting and aligning projects to ensure NI's response to the challenge is optimal.

---

19 Skills Strategy Consultation: Skills for a 10x Economy

WOMEN IN STEM

Getting it right: The Royal Academy of Engineering

The Royal Academy of Engineering is a charity that harnesses the power of engineering to build a sustainable society and an inclusive economy that works for everyone. Last year it established its first regional Enterprise Hub in Northern Ireland to support the region's brightest technology and engineering entrepreneurs to realise their potential.

In October 2021, the Academy and DfE signed a Memorandum of Understanding, formalising an agreement between the organisations to work together to deliver an engineering talent programme in Northern Ireland.

This agreement marks an important milestone in the work of the Department and the Women in STEM Steering Group, who have been working together to develop programmes to ensure that girls and women have the best possible opportunities to pursue Science, Technology, Engineering and Maths (STEM) subjects and careers.

The Memorandum underpins the beginning of a partnership with DfE which will involve the development and delivery of a Talent and Diversity initiative, tailored to the region, but based on the Academy's existing Welsh Valleys Engineering Education Project.

The Northern Ireland programme, which has a value of £500,000, will bring together schools, colleges, universities, industry, local government and wider STEM stakeholders to deliver a sustained STEM education programme. The aim is to raise the aspirations of a diverse range of young people to pursue STEM subjects and STEM careers, with a focus on engineering pathways.

Economy Minister Gordon Lyons said, "My Department and the Royal Academy of Engineering want to build a collaborative partnership to deliver a pilot regional engineering education programme in schools across Northern Ireland. This MoU represents our commitment to partner with clearly aligned goals and values.

"I welcome the efforts of the DfE Women in STEM Steering Group who have worked closely with the Department, co-designing an Action Plan to help ensure that women and girls are encouraged into well paid and interesting careers in science and technology. This programme is one of three endorsed by the Steering Group to have been allocated Economic Recovery Action Plan funding. The support of the Steering Group combined with our new partnership with the Royal Academy of Engineering means that there is now a real opportunity to start closing the gender gap in these sectors and help grow the economy."

WOMEN IN STEM

MEASURING PROGRESS

DfE's Vision for a 10x Economy sets out our ambition to make a generational change to our economy and to our ways of living. That new ambition needs to be matched by a new approach to how we measure the progress we are making.

DfE is consequently developing a core set of metrics which it will use to assess our progress towards achieving 10x. These will identify how we compare to the best in class economies globally and how our performance is improving against those exacting benchmarks.

We want to draw on this approach for Women in STEM and link our progress to 10x. This means that – as we develop the detail under each action in this plan with delivery partners – we will agree and assign targets that align with the indicators being developed for DfE's Vision for a 10x Economy.

WOMEN IN STEM

OUR PROGRAMME FOR ACTION

Introduction

This section sets out the detailed timing and costs for implementing the 22 actions set out in this plan.

Most actions from Strands 1, 2 and some from 4 have been prioritised for delivery within the existing or anticipated DfE allocation. **Delivery of Strand 3 "Leading Change" and the remaining actions in Strand 1, 2 and 4 DfE requires additional funding.**

Once we have reviewed the progress and impact of our current plan, spending plans for years 4 and 5 will be developed for consideration.

DEEPENING OUR UNDERSTANDING

Action	Description	Deliver by
DU1	Develop a detailed map of the women in STEM ecosystem that identifies the key elements, connections and dynamics between its constituent parts.	March 2022
DU2	Identify the full range of services that currently exist to increase the In Demand STEM workforce and map where they sit in the ecosystem.	March 2022
DU3	Conduct detailed desk research into the known challenges faced by other economies seeking to increase the number of women in STEM.	February 2022
DU4	Develop our knowledge of the influences on girls from 0-5 and through the transition into primary school.	February 2022
DU5	Build a learning network with policy makers internationally.	February 2022
DU6	Prepare a policy insights paper that sets out key lessons and recommendations for further action.	March 2022
DU7	Use the policy insights paper to inform development of the Highly Skilled Workforce work programme required to deliver DfE's Vision for a 10x Economy the Skills Strategy, Skills for a 10x Economy.	March 2022
DU8	Agree and secure funding for delivery of the policy paper recommendations.	March 2023 subject to securing the required funding

WOMEN IN STEM

47

WIDENING DIALOGUE AND SHARING KNOWLEDGE

Action	Description	Deliver by
WD1	Refresh our key messages and approaches to take account of the new strategic context in which NI is operating.	March 2022
WD2	Develop a strong core message and use it to conduct dialogue across a mix of strategic channels.	March 2022
WD3	Engage individuals, groups and organisations on the demand side who have limited awareness of, or interest in, the need to increase the number of women in the In Demand STEM workforce.	Ongoing
WD4	Bring forward proposals on what NI must do to ensure it has the culture and value system it needs to support positive change, learning and evolution.	March 2022
WD5	Secure funding and implement collaborative proposals to ensure NI has the culture and value system it needs to support positive change, learning and evolution.	March 2023 onwards subject to securing the required funding

WOMEN IN STEM

LEADING CHANGE

Action	Description	Deliver by
LC1	Bring organisations together to review existing provision and to determine how to co-ordinate services to plug existing gaps and to remove existing overlaps.	October 2022 subject to securing the required funding
LC2	Bring forward proposals to create a new priority channel within the pipeline that is focussed on increasing the volume of In Demand STEM skills.	March 2023 subject to securing the required funding
LC3	Continue to support wider STEM skills development through the pipeline to provide the foundation for future growth.	March 2023 onwards subject to securing the required funding
LC4	Draw on the support and expertise of the Women in STEM Steering Group in leading the transition.	January 2022 onwards
LC5	Hold follow up events with providers to lay out the proposed changes and to secure their buy-in.	October 2022 onwards subject to securing the required funding

WOMEN IN STEM

BRIDGING THE TALENT GAP

Action	Description	Deliver by
BG1	Lead a planning sandpit with Invest NI, the Office for Talent and with key partners in business to explore the potential and options for attracting talented women working in STEM to Northern Ireland.	March 2022
BG2	Develop and evaluate key options, including determining resource requirements, partnership arrangements and lead responsibilities of all actors.	March 2022
BG3	Finalise and securing funding for the agreed plan.	March 2023 subject to securing the required funding
BG4	Implement the plan.	March 2023 onwards subject to securing the required funding

WOMEN IN STEM