



EMERGE ACTION PLAN

Ireland – MMS

Regional Partnership Framework





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Executive Summary

The EMERGE (Empowering Female Engineering Entrepreneurs) project is an ERASMUS+ project which included 6 Partners from Poland (2), Ireland, Turkey, Denmark and Norway (see figure 1). As part of the project EMERGE developed partnerships leading into Action Plans. This involved 3 cross sectoral partnerships with Ireland, Turkey and Poland, each involving 15+ representatives of stakeholders from VET, HEI, Engineering, enterprise and economic development sectors, drawn from public, private and non-profit organisations. This involved five plenary meetings of the partnership which were held throughout the project and each partner developed a corresponding Action Plan with concrete individual and collective commitments to improving access and quality of support from the entrepreneurship education ecosystem for women in engineering.

Part of the Action Plans partners assessed formally the current skills gaps and existing learning pathways for female entrepreneurs in engineering. Partners were given the opportunity to recommend innovative pedagogical approaches and policy. Partners also shared as to how to improve access to quality of support from the entrepreneurship education system. Partners discussed the best approaches as to how to transform access to and the quality of the training female engineering pioneers receive from entrepreneurship VET institutions.

The Action Plan that follows will provide context and justification for VET learning pathways for women in engineering in each of the partners regions (Ireland, Turkey and Poland). It will provide the specific learning objectives for the Female Start Up in Engineering VET curriculum. The role and time frame and results of each actor in implementing the policy recommendations will be identified. Throughout this document you will see a series of milestones, events, actions, meetings, targets, objectives and achievements which were made by each of the dynamic partnership actors.

EMERGE ACTION PLAN

The EMERGE (Empowering Female Engineering Entrepreneurs) project is an international project financed by ERASMUS+ program as a part of 'Cooperation for innovation and the exchange of good practices' key action. The project is implemented from the 1st of December 2018 to 30th of November 2020 in international environment of 6 Partners from Poland (2), Ireland, Turkey, Denmark and Norway (see figure 1).

EMERGE was developed in response to several challenges and barriers faced by female engineer entrepreneurs e.g. The Entrepreneurship Education for Women in Engineering 2016 paper 'Aside from women's individual characteristics and values, women's perceptions of environmental conditions in male dominated fields can play a role in their academic and career decisions. In entrepreneurial environments, specifically, women must be willing to undergo public scrutiny when pitching their ideas to potential customers and investors. Failure to successfully convey the

value of one's product could ultimately ruin a business before it even gets off the ground'. It also states that 'Moreover, business minded individuals must be aware of their potential competitors and strive to consistently outperform them to ensure the vitality of their enterprise. Research indicates that competitive high-risk environments such as entrepreneurship can discourage women's participation and hinder their performance'. 'Additionally, the severe underrepresentation of women in male dominated fields such as entrepreneurship may exacerbate feelings of isolation and belonging, which could also influence women's performance in these settings.

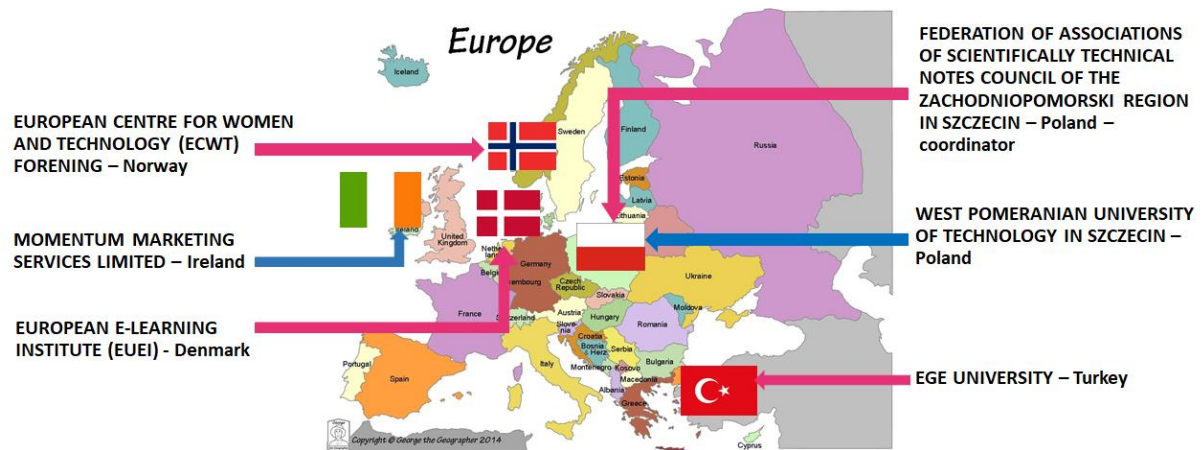



Fig.1 Partners of EMERGE Projects

The EMERGE project aims at increasing the number of female entrepreneurs working in engineering, as a result of improved access and quality of support from the entrepreneurship education ecosystem. To achieve this goal three main activities are provided:

- ✓ Establishing of 3 EMERGE Partnerships between actors in the engineering development ecosystem in Poland, Turkey and Ireland in order to share knowledge and practice
- ✓ Development of a suite multilingual Open Educational Resources (OERs) for Vocational Education and Training & Higher Education (VET & HE) practitioners to update their knowledge and skills, and with an online course for female entrepreneurs, implementing the most recent pedagogic strategies
- ✓ Implementation of an innovative apprenticeship-style learning placement framework for young woman with engineering start-up potential in high growth engineering Small & Medium Enterprises (SMEs)

The background of the proposed activities is focused on recognition and development of key competences in entrepreneurship for female engineers. The applied approach, to recognize and describe the needs on this field as well as to indicate solutions and best practices specific in different part of Europe, is focused on elaboration of 3 regional Action Plans in Poland, Ireland and Turkey.



The purpose of the Action Plans was to provide the impacts and the benefits of the participation in the Partnership Plans, ultimately increasing commitment to introducing access to and the quality of the training of female engineering entrepreneurs to what they received from entrepreneurship VET institutions. They also provided recommendations as to which VET formats are most suitable for the region. They demonstrate commitment by VET and HEI to introducing EMERGE deliverables (IO2 and IO4) to their training services. Finally, they were pivotal in providing a platform for exchange of knowledge, tools and innovation so that recommendations of the EMERGE deliverables would be achieved in their external and professional networks within and outside their regions. This involved formal and informal collaboration with stakeholders representing: Universities providing engineering fields of study, VET organizations providing entrepreneurship education, HEI organizations providing engineering education, organizations providing social skills (including coaching), governments, entrepreneurship supporting organizations, venture capital, business angels, incubators/ TTOs and science parks, private trainers and consultants, employment agencies and entrepreneurs. Its purpose dedicated to analyzing the situation of women engineering entrepreneurship, identify learning areas needed to be increased and not covered by courses and trainings delivered by existing education systems and indicate learning objectives and pedagogical recommendations for innovative OER.


In accordance with applied methodology, to elaborate 3 regional Action Plans covering individual interests of EMERGE project goals, there were organized plenary and informal meetings letting to gather necessary information, including regional context and justification for learning pathways, for woman in engineering in Ireland, Poland and Turkey.

The development of the Action Plans was achieved by using four innovative approaches;

- ✓ Having a dedicated focus on female entrepreneurs in engineering as a new development at local and regional level and especially in our regions that are outside the traditional urban tech hubs
- ✓ Adapting a tight focus of a learning framework that was tailored to regional needs and the projection of specific learning targets
- ✓ Identifying new ways of integrating new access to and the quality of the training female engineering entrepreneurs receive from entrepreneurship VET institutions, learning that will embrace different but equally effective approaches.
- ✓ The techniques were collaborative involving face-to-face contact during meetings but also using digital tools for teamwork and collective review of outputs.

The conducted discussions and obtained guidelines were the basis to include in this Action Plan:

- ✓ the knowledge areas to develop referring to woman engineers entrepreneurship,
- ✓ the proposal of course curriculum range and pedagogical approach to answer the identified needs,
- ✓ the analysis of the education programs and opportunities in the region and outside the region taking into consideration the entrepreneurs education,
- ✓ the actions that could be taken in regions to increase the entrepreneurship attitudes,
- ✓ the potential perspective offered in region to finance and develop new business,

- 
- ✓ the personal profile (persona) of typical woman engineer in relations to education level and needs.

This document is the Action Plan elaborated on the basis of information gathered in Ireland, summarizing in two main sections the current problems in the field of woman engineers entrepreneurship education as well as presenting the recommendations of possible actions that could be taken to improve this state of art. We encourage you to familiarize yourself with its content.

Snapshot of the benefits of EMERGE

✓ For the Region:

- Increased number of female engineering entrepreneurs by transforming their access to and the quality of the training they receive from entrepreneurship VET and HEI institutions
- Economic growth and a win-win for businesses

✓ VET HEI Business Alliances

- More effective career guidance and work placement
- Access to untapped talent and competence-skills workforce

✓ For Female Entrepreneurs

- Experience work in a high growth engineering enterprise for a structured placement period
- Access to an engineering support toolkit & Community

Why a Regional Partnership Plan approach?

EMERGE places VET business and HEI partnerships at the heart of the project creating a conduit between actors in the EMERGE engineering entrepreneurship development ecosystem in Poland, Denmark, Norway, Turkey and Ireland. By creating a wider stakeholder, VET and HEI Regional Partnership Plan (O1) in each region, we respond to the need to develop more strategic and integrated use of open education resources in education and training systems. Our Regional Partnership approach seeks to provide an important platform to create and deepen ongoing relationships between diverse institutions working in vocational education and training in innovation and entrepreneurship. It nurtures a shared commitment to increase the number of female entrepreneurs in engineering by transforming their access to and the quality of the training they receive from entrepreneurship VET institutions and HEI organisations. In particular Regional Partnerships have the capacity to support and disseminate the project's presence and reach within our region and fulfills the EU Commission thinking on regional partnership structures:

“Any public intervention aiming to further develop a sector calls for cross-sectoral fertilisation. This requires the development and testing of better business support instruments and policies that aim to facilitate cross-sectoral linkages and spillovers. It implies fostering change amongst the



sectors themselves while adding new skills and competencies.” - EU Commission

This Regional Partnership Plan can be utilized by academic actors, higher education policy makers as well as by business actors, organizations and chambers. It facilitates the creation of the conditions and organizational connections that are essential for the processes promoting Women Entrepreneurs in engineering

Additional useful materials will be also produced in the framework of the Erasmus+ EMERGE program. These will be available free of charge on the following address www.emergengineers.eu. We recommend that those who are interested in this topic visit our website to access our resources.

THE IRISH CONTEXT

REGIONAL LEARNING FRAMEWORK – IRELAND

Innovation in our region is embedded in policy – the Regional Action Plan for Jobs North West sets out the key ambition in our area is to: Get more of the region’s enterprises engaged in research, development and innovation to enable them to remain at the cutting edge of innovation and to achieve competitive advantage for the region as a strong knowledge economy.

In 2015, just a quarter of people working in Ireland’s STEM (Science, Technology, Engineering and Maths), industries were women. Even fewer are female founders of STEM businesses. The Enterprise Ireland Female Entrepreneurship Unit was established in response to an underrepresentation of women entrepreneurs in Ireland. Their purpose is to support ambitious women entrepreneurs to launch and grow High Potential Start-Ups, and to address the key challenges facing women in start-ups.

Just 12% Of Engineering Professionals are Women as Gender Gap Persists, New Engineers Ireland Report Finds

- Very few engineering employers have been specifically targeting the recruitment of female talent, which has the potential to help overcome the engineering skills shortage that is still hampering industry in Ireland, according to the report
- Over 780 events take place nationwide involving 75,000 participants to Engineers Week in 2018
- Just 16% of the engineering graduates are women with the overall ratio currently just one woman to eight men in the engineering profession (a new Engineers Ireland Report revealed)
- The Engineering 2018 report also showed that total higher-level STEM subject sittings by female students for the Junior Certificate have now increased to 41%, and to 43% for the Leaving Certificate [Engineers Ireland – 27 February 2018](#)

UCD Engineering Graduates Association Report 'Towards Gender Balance in Engineering'

Stated in Engineers Ireland the percentage of members who are women is 8.85% and in different membership categories the figures are:

Table 1 Engineers Ireland Membership by Gender

MEMBERSHIP TYPE	% WOMEN
Fellow	3.37 % (48 of 1421)
Chartered Engineer	9.62% (556 of 5777)
Member	9.58 (926 of 9665)
Associate Engineer	5.02 % (9 of 179)
Engineering Technician	0 (0 of 30)
Technician	2.02% (7 of 345)

Top Female Entrepreneurs Call for New Cultural Norm

- New figures published by the Central Statistics Office on Thursday showed just one in nine chief executive officers in large enterprises in Ireland in 2019 are women, while women occupy only 28 per cent of senior executive roles.
Irish Times 2019
- Just 16% of engineering graduates are women, with the overall ratio currently just one woman to eight men in the engineering profession, a new Engineers Ireland report has revealed.
www.Irishtechnews.ie
- Women are greatly under-represented in the STEM workforce in Ireland. The Central Statistics Office (CSO) estimates that fewer than 25% of approximately 120,000 people working in jobs that use STEM skills but are women
www.education.ie

Number of Female-Founded Irish Tech Firms on the Rise

While there has been a significant increase in companies established in recent years by women in Ireland, the percentage of female-founded start-ups remains relatively low. In fact, such firms represent only 15 per cent of the 1,460 companies currently tracked by TechIreland. According to the figures, some 23 per cent of women-led start-ups are working on enterprise solutions with a

further 22 per cent in the health/medical area. In addition, 12 per cent are focused on the consumer/ecommerce segment with 14 per cent covering entertainments/sports. Irish female-founded tech start-ups are young, well-funded and skilled at creating employment.

Data compiled by TechIreland reveals there are currently 224 Irish female-founded start-ups employing 2,761 people. Female-founded companies are no slouches when it comes to funding with 43 per cent having so far secured investment with some firms such as Anam, Nuritas and Carrick Therapeutics, raising at least €5 million each. Collectively, female-founded companies have raised €263 million in investment with an average funding size of €1.1 million. Approximately 6 per cent of female-founded firms are working on artificial intelligence (AI) with a further 5 per cent in the Internet of Things (IoT) space

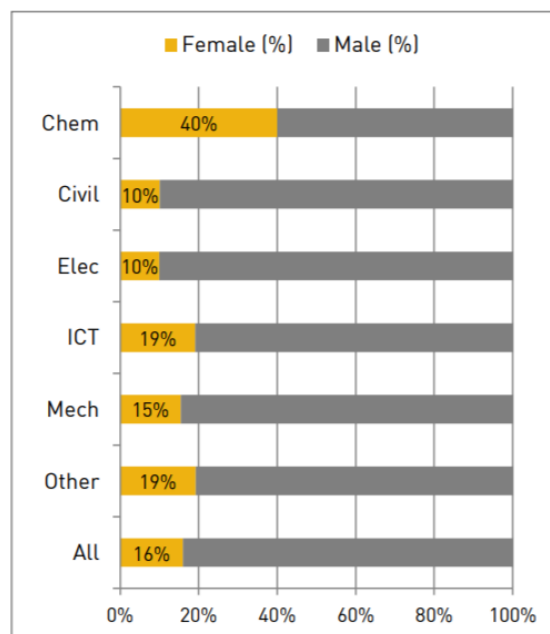
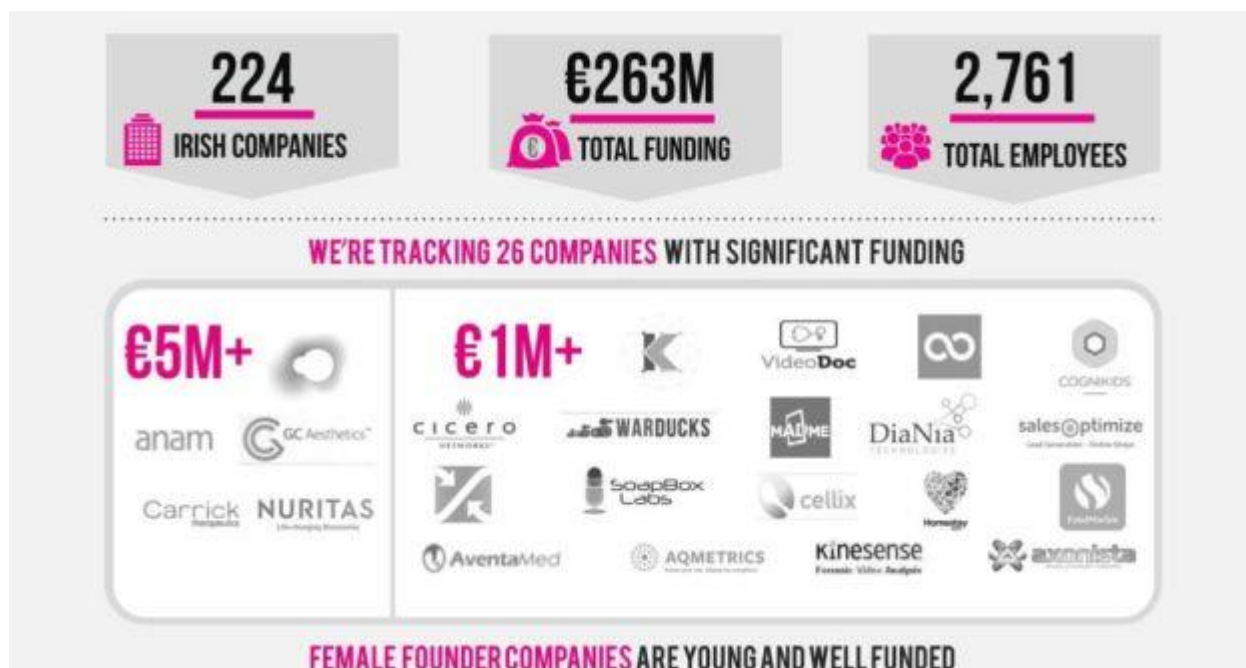


Figure 1. Gender imbalance among engineering graduates

The latest GEM report (2013) notes a number of challenges in the Irish economy, including:

- ✓ The prevalence of early stage entrepreneurs in Ireland is at an all-time low
- ✓ The perception of opportunities for new business remains low
- ✓ There are difficulties reported with access to finance.

In addressing some of these challenges an Entrepreneurship Forum was established, which published its report on Entrepreneurship in Ireland, highlighting the following six goals for a successful entrepreneurship policy:

- ✓ Strengthening the start-up community in Ireland
- ✓ Increasing the pipeline of entrepreneurs
- ✓ Energising job creation
- ✓ Continuing growth of the indigenous export sector
- ✓ Capitalising on Ireland's strengths in growth industries
- ✓ Using under-employed resources.

OUR DEFINED REGION & STAKEHOLDERS

The Irish EMERGE Regional Partnership was defined to fit into and benefit from a key strategic regional economy project- the Upper Shannon Erne Future Economy project – USEFE. This is a joint initiative between businesses, the Local Authorities of Cavan, Leitrim, Longford and Roscommon, Bord Na Mona and ESB across the four counties. USEFE operates on the basis of a joint initiative between municipalities and businesses of varying sizes within key sectors for the region.


Momentum drew up a listing of those involved in the region's education, engineering and business support ecosystem, drawing on established strategic level connections with key stakeholders and getting an appropriate mix of organizations and individuals in the region including




- VET and HEI providers from the public, private and not-for-profit sectors, such as regional colleges, technical schools, enterprise centres, business incubators etc.
- Higher Education Institutions – universities and colleges with a strong engineering and entrepreneurship focus
- Local enterprise agencies and business development services providers
- Small Firms' representatives (Chambers of Commerce, Small Business Federation etc)
- Women in business networks




- Statutory organizations responsible for enterprise and economic development
- Local government and regional development authorities
- Emerging and existing women entrepreneurs in engineering



Stakeholder – organisation name	What the individual and organisation can contribute to the Partnership?	Reach <i>(International, National, Regional, Local)</i>	Impact on VET Business Partnership <i>(High, Medium, Low)</i>	How can they benefit from the VET Business Partnership? What is in it for them?
Sligo IT School of Engineering	Access to student and graduate base Access to network of other Schools of Engineering & Design in Ireland	Regional	High	Can signpost students and graduates to new training programme specifically designed for them Students can benefit from Learning Placements
Letterkenny School of Innovation	Regional innovation ecosystem Access to other ITs	Regional	High	Adds to the innovation support base in the region Students can benefit from Learning Placements
Regional Skills Forum	Regional training needs Existing and emerging training provision Dissemination to other key stakeholders	Regional	High	New training course for the region
The Hive	Access to client base of technology businesses – existing and emerging	Regional	High	Supports for their female client base. Can add a new training programme to their offering Benefit from pilot testing



Enterprise Ireland	Dissemination to women led engineering businesses in the region	Regional	High	Can add to their enterprise training programme offering Benefit from pilot testing
Leitrim County Council	Dissemination to emerging women led STEM businesses in the region	Regional	High	Can add a new training resources supporting businesses Benefit from pilot testing
Upper Shannon Erne Future Economy Programme	Reach beyond Leitrim to Roscommon, Longford and Cavan Local Authorities and LEOs and their client bases	Regional	High	Reputation as an innovative region
Roscommon Leader Partnership	Reach beyond Leitrim to Roscommon, Longford and Cavan Local Authorities and LEOs and their client bases	Regional	High	Reputation as an innovative region
Banbridge District Training	Guidance on training and support needs Guidance on design and implementation of Learning Placement	Regional	High	Profile building as a key ambassador in training and enterprise support Can add a new training resources supporting businesses Benefit from pilot testing



ETBs (x4)	Guidance on training and support needs Guidance on design and implementation of Learning Placement	Regional	High	Profile building as a key ambassador in enterprise and skills training
VET Sligo	Guidance on training and support needs Guidance on design and implementation of Learning Placement	Regional	High	Profile building as a key ambassador Can add a new training resources supporting businesses Benefit from pilot testing


OBJECTIVES

The Irish Regional Partnership set out to bring together the diverse actors in the entrepreneurship development to create this Action Plan that would yield a more inclusive and female engineering and entrepreneurship friendly VET and HEI sector and long-term support for female entrepreneurs in our region. Specifically, the Partnership sought to:

- ✓ help overcome information failures. Much of the female engineering expertise and the knowledge of female entrepreneurship already exists as a separate, working in isolation in the hands of HEIs (public) and specialist training providers (private and non-profit). The Partnership will enable effective multi actor knowledge sharing and shorten the learning path.
- ✓ devise formative assessment of learning gaps, learning objectives and pedagogical recommendations for female engineering entrepreneurship open education resources.
- ✓ build social capital. As well as the firm commitments in the form of Action Plans, the Partnership is an ongoing space for collaborative work, contributing significantly to the dissemination and sustainability aspects of the project.

How this Action Plan evolved?

The principle feature of the Partnership building process was stakeholders' participation in plenary meetings, and in a series of follow up multilateral meetings. The following schedule of activities was undertaken: -



Activity	Timeframe	Description
1st Plenary Meeting <i>Lough Rynn Castle, Mohill, Leitrim, Ireland</i>	01 July 2019 with 17 attendees	<ul style="list-style-type: none"> • Included stakeholders representing key agencies, female engineering educators and entrepreneur support agencies, policy makers to get their commitment to become part of the Irish EMERGE Regional Partnership. These meetings were ongoing to ensure the Partnership remained fresh and reflective of the evolving women in engineering entrepreneurship energy in our region. • It involved the initial introductory to the EMERGE project and EMERGE Regional Partnership Framework via presentation • The meeting identified the mission of the EMERGE Partnership meetings and how together we could work towards the development of the project and how it can achieve its objectives • We looked at Local formative assessment of the current skills gaps and existing learning pathways for women entrepreneurs in engineering <p>We discussed and scribed the problems observed in the region in the implementation of the entrepreneur's career by female engineers. Why do women engineers encounter problems in their entrepreneurial career in our region? – in case of:</p> <ul style="list-style-type: none"> ✓ Formal education (in schools, colleges, on-line courses) - content and methods ✓ Practical education (practice, learning through action) ✓ Career paths (creation of own enterprises, entrepreneurial activities inside existing organizations) <ul style="list-style-type: none"> • It was in this meeting the key 17 partnership attendees signed the Partnership Declaration • Key questions specific to Meeting 1 were identified to attendees in the MMS Ireland EMERGE Presentation and Agenda. Responses were typed by MMS representative as they were provided at discussion level • Commitment to Partnership with EMERGE Project

• Photos



2nd Plenary Meeting

30 August 2019

Landmark Hotel, Carrick on Shannon, Leitrim Ireland

with 17 attendees

For Meeting 2 we had the same main attendees and other participants. Jointly we discussed the following;

- Assess the current skills gap and existing learning pathways for female entrepreneurs in engineering
- Recommendations regarding innovative pedagogical approaches and policy
- Recommendations on how to improve access to and quality of support from the entrepreneurship education ecosystem
- Recommendations on how to transform access to and quality of support of the training female

entrepreneurs in engineering receive from regional institutions

- Recommendations to IO2 and IO3 and IO4 (which solutions are most suitable for the region)
- Greater implementation of project results (deliverables) – support for dissemination and sustainability

Existing curricula, gaps in curricula, suggested areas of training objectives

- Engineering Entrepreneurship – Where are the women?
 - Validating and incubating Engineering ideas – Ultimate test of viability
 - Accelerating Engineering Start-ups – Getting your business model right
 - Investor ready business planning
 - Self-confidence, assertiveness and risk taking
 - Networking and access to relevant technical, scientific and general business networks
 - Funding issues for female entrepreneurs in engineering, tackling gender bias and attracting investment (focus on finance available especially venture capital)
-
- Commitment to Partnership with EMERGE Project
 - Photos



**3rd Plenary
Meeting**

12
December
2019

For Meeting 3 we had the same main attendees and other participants. Jointly we discussed the following;

**Viewmount
House,
Longford**

with 15
attendees

- Action planning 1 – what do we want to achieve and how can we achieve it?
- Policy recommendations regarding the introduction of innovative flexible pedagogical approaches
- Recommendations regarding improvements of access to and quality of support from the entrepreneurship education ecosystem
- VET & HE institutions
- Other actors (to be specified in regions)
- Policy recommendations regarding the introduction of innovative flexible pedagogical approaches
- Recommendations regarding policy supporting innovative pedagogical approaches
- Commitment to Partnership with EMERGE Project
- Photos



PROJECT – ACTION PLAN FRAMEWORK

PART 1 – Regional Learning Framework



Partnership Meeting 1

- 1.1. Context and justification for learning pathways for woman in engineering in the region**
Engineering, women in engineering, women entrepreneurs – regional data found to be used for individual meetings and at the plenary meeting #1
Problems observed in the region – results of individual interviews

Partnership Meeting 2

- 1.2. Specific learning objectives for the Female Start-up in Engineering curriculum – results from individual interviews and plenary meeting #2 & #3 & survey**
- 1.2.1. Existing learning pathways
 - 1.2.2. Skills and learning pathways gaps
 - 1.2.3. Proposed areas of learning objectives
 - 1.2.4. Innovative pedagogical approaches used and needed

Partnership Meeting 3

- 1.3. Policy recommendations regarding the introduction of innovative flexible pedagogical approaches – results from individual interviews and plenary meeting #1, #2 & #3 & survey**
- 1.3.1. Recommendations regarding improvements of access to and quality of support from the entrepreneurship education ecosystem
 - VET & HE institutions
 - Other actors (*to be specified in regions*)
 - 1.3.2. Recommendations regarding policy supporting innovative pedagogical approaches

PART 2 – Plan for actions

- 2.1. Implementation of policy recommendations in the regional context – results of individual interviews and plenary meeting #1 & #5**
- 2.2. Actions to be completed - results of individual interviews and plenary meeting #1 & #5**
- 1.2.1. Development and improvement of learning intervention (curriculum and pedagogical approach)
 - 1.2.2. Implementation of learning intervention
 - 1.2.3. Other (*to be specified in regions*)

PART 1 – REGIONAL LEARNING FRAMEWORK

Partnership Meeting 1 – Participant Responses

Question regarding point 1.1

Problems observed in the region in the implementation of the entrepreneur's career by female engineers

Why do women engineers encounter problems in their entrepreneurial career in our region? – in case of:



- Formal education (in schools, colleges, on-line courses) - content and methods
- Practical education (practice, learning through action)
- Career paths (creation of own enterprises, entrepreneurial activities inside existing organizations)

Answers – Problems encountered in entrepreneurial career

- **Gender imbalance** – most female entrepreneurs in engineering are the only woman in the room with 10 engineers, they feel intimidated and singled out when they speak if they get the opportunity.
- **Unsure what job they can apply for** - Female STEM students are unaware of their job options and what they can apply for once they graduate. STEM female graduates are not comfortable about contacting a person working in industry about potential job opportunities. It was mentioned in the meeting that WiSTEM2D offers women studying in STEM2D courses the opportunity to engage with women working in these careers. First hand experience of site tours, mentoring, project and career workshops to enable graduates to visualise exactly what it is like to have a career in STEM. It was recommended if this was included in the EMERGE project across all fields and life stages would be very beneficial.
- **Representing something bigger – all women both engineers and non-engineers** – most female engineers both graduates, entrepreneurs and start-up entrepreneurs feel they need to be exceptional at what they do and not just average or good. Their biggest fear is making a mistake or letting down other women. Working as a minority means you stand out.
- **Women tend to feel as though they are ‘helpers’ and do not hold positions of authority** – they are not taken seriously, ignored in discussions, not taken seriously especially if they are graduates and working with an experienced crew. Women have to work harder and prove themselves. It was suggested to provide women with different communication strategies and confidence building techniques such as what they can uniquely bring to the room and role in the resources.
- **Attraction and retention suitable to female needs** - It was also indicated that it would be beneficial to identify and communicate best practices for attracting and retaining female talent to engineering companies and possibly have existing female engineers as the introductory person or main communicator with the graduates. This could include ensuring there are pre-existing female programs and policies e.g. maternity packages.
- **Right female specific graduate skills with right company** - Matching up the right graduate with the right company, preferably women have stated it would be good to work with a company that already has female engineers, or female programs, female specific projects where they could use their female skills better e.g. on female products and devices.
- **Are not aware of Female Engineering Support Networks** – graduates felt they are left to their own devices after college. Joining a female engineering support network and enterprise network suitable to engineers would be beneficial. Information about these networks, their



focus are, supports and who they also work with would be beneficial. It was emphasised that the networks that would be most valuable would be enterprise development and those that existing engineering companies are already affiliated with.

- **Student/Graduates have no relationship with Engineering Companies.** Engineering companies should be encouraged to integrate more by universities and colleges with engineering students and graduates – companies currently do not know how to reach out to female engineers and graduates. Unless female engineers approach, apply and specify they are female companies are none of the wiser. It would be beneficial if engineering companies had better access to female engineers and potential employees. It was recommended then the site visits could be part of their graduate experience and project content. This gives a valuable insight into what the company does, how it operates and what potential jobs are available in that particular company. Having a solid relationship and communication network with educational organisations is important particularly before graduates finish college.
- **Lack confidence, drive, passion and pushing forward** – ensuring females are equipped with both personal skills and educational skills is important for them to move forward and engage with potential engineering companies, employers and colleagues.
- **Little to No Work Experience** – the biggest challenge for female engineers is gaining work experience. Many spend hours researching and applying for internships or volunteered. The possibility of working with an engineering entrepreneur can help overcome challenges and barriers.
- **Don't have their say in the classroom environment, damages their self confidence** – ensure female engineering students who are often very few don't feel isolated, experience jokes/remarks about being female. Make sure that lecturers give them a say and that they attain the respect of their male counterparts. This could include showcasing powerful or famous female engineers as examples in the studies showing a balanced field of play between male and female engineers in the external world.
- **Need more balanced gender module topics and content** - Include in the teachings it is important to know how to communicate with both male and female by including communication skills modules and role plays. The women in the classroom will be seen as useful to their learnings and a good way for in turn for the men to learn how to communicate to women. Particularly when learning the different challenges when communicating with different genders, cultures, nationalities etc. Make sure female students are seen as an important addition and included in all teachings.



Partnership Meeting 2 – Participant Responses

Question regarding point 1.2

Existing curricula, gaps in curricula, suggested areas of training objectives

- If a woman engineer wanted to start a business and start a start-up company, what skills and knowledge does she need (apart from the business idea)?
 - Are there any courses, trainings, academic subjects, postgraduate studies that can help her in this?
 - What is the best path for personal development and education according to you that will lead her to this goal?
 - What are the biggest potential gaps in education in this area?
 - What should the teaching goals for such a person look like?
- * all of the above questions in relation to the proposed thematic areas of training:
1. Engineering Entrepreneurship – Where are the women?
 2. Validating and incubating Engineering ideas – Ultimate test of viability
 3. Accelerating Engineering Start-ups – Getting your business model right
 4. Investor ready business planning
 5. Self-confidence, assertiveness and risk taking
 6. Networking and access to relevant technical, scientific and general business networks
 7. Funding issues for female entrepreneurs in engineering, tackling gender bias and attracting investment (focus on finance available especially venture capital)

Answers – Skills Needed to Start Up A Business

- **Skills needed to start up a business - Connect with Mentors and Role Models** seek out their own mentors as well as the ones assigned. Don't be afraid to ask mentors or people that may be able to help you if they'd be happy to mentor. Most likely they will say. Don't necessarily need to be female, doesn't need to be formal, can be a colleague.
- **Skills needed to start up a business - Communication Skills, Teamwork & Collaboration** People skills are just as important as your technical know-how. This is because a big part of any engineering job is communicating with, and working alongside, your colleagues. The company's success can depend on its teams' collaboration and mutual understanding.
- **Skills needed to start up a business - Resilience** engineers try to fix problems that can be difficult to understand and solve. Learn the skill of failing, learning, adapting, growth because a lot of entrepreneurs have failed many times before succeeding.
- **Skills needed to start up a business - Stakeholder Engagement/People Skills internally/externally** - this includes clients, investors, potential shareholders, support agencies. It can be tricky to persuade your idea. Engineers need to be able to convince their idea/product is the right one. Persuasive tactics are very useful. Confidence building is




important and getting the pitch right for the job, speaking at meetings, producing best work, negotiate salaries, put forward for promotions, being an influential leader

- **Skills needed to start up a business – Finding Solutions elsewhere** – the problem may not be solved by one person, you may need to meet with other engineers, interact with other people in the same field or with more experience. Work actively with others is very important by participating in discussions, sharing their ideas, listening to other people and shows an interest in their opinions will achieve much better results. Building these relationships, solution driven conversations and the ability to do so is key. These connections and relationships can be crucial to marketing? Crucial to winning work by word of mouth?
- **Skills needed to start up a business – personal development** – learn how to keep pushing yourself and stepping out of your comfort zone in your job. Push and put yourself forward for more responsibility as much as possible. This grows confidence, teaches responsibility, learn new roles/jobs and become more competent in your field.

Answers – Career Path, Training/Courses

- **Career Path, Training/Courses - Show your Soft Skills in Job Applications** – when it comes to writing a job application and attending interviews, engineers need to learn how to show off their soft skills as well as your technical ability. Talk about examples of developed key skills, including teamwork, communication and the ability to build relationships. Draw on examples from your degree, such as giving a group presentation; from work experience, such as working together to meet an important deadline; and from extracurricular activities, such as playing for a football team.
- **Career Path, Training/Courses – see yourself as entitled to a role** – be able to see yourself in the role applied for, this will get your mind in gear for that role and help you visualize when preparing for the application and interview. See yourself as another prominent woman in a role and picture yourself there, this is good pressure and will propel engineers forward in their career.
- **Career Path, Training/Courses – Research/Attend university open days – research and attend university open days** to find out as much information as possible about the various engineering disciplines, speak to people working in industry about engineering careers and, above all, believe in yourself! Try to open as many doors as possible. Prepare for your future and where you want to go before you leave college and what company(s) you potentially want to work for.
- **Career Path, Training/Courses – work on professional and personal development** - Work hard on your personal development. If it's what an engineer finds interesting, believe and forget about any stereotypes. The knowledge and skills are the most important things. It's what the engineer does and how they do it that makes them a good engineer.
- **Career Path, Training/Courses – Engineers Ireland have the multiple varied engineering courses** – these include communication skills, marketing. Engineers Ireland has over 25,000 members from every discipline of engineering, Engineers Ireland is the voice of the engineering profession in Ireland, providing;

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1. Promote knowledge of engineering.
 2. Establish and maintain standards of professional engineering and engineering education.
 3. Provide opportunities for Continuing Professional Development (CPD) for engineers.
 4. Maintain standards of professional ethics and conduct
 5. Ensure that professional titles are granted to qualified candidates
 6. Act as the authoritative voice of the engineering profession in Ireland
 7. Continuing Professional Development (CPD)
 8. Program accreditation
 9. Corporate Partners membership

Build **strong educational relationships** with Irish universities and institutes of technology, primarily through our role in the accreditation of their engineering program. Most network events and lectures are open to the general public.

Career Path, Training/Courses – DIT tackles gender gap in engineering through mentorship programme ESTeEM – this program pairs students with successful women mentors from two of the largest multinational engineering companies in Ireland: Arup and Schneider Electric. The goal of the mentorship programme is to provide female students with role models who can offer guidance about career opportunities in engineering, provide support and tools for navigating this male-dominated industry, and entice more young women into the field.

Innovative teaching methods - use and needs

- What teaching models and different pedagogical methods and measures could be used in this context?
- What methods are used and what is their effectiveness?

Answers – Innovative teaching methods

Include Mentors & Role in teaching – get in company engineers, mentors and other graduates to present to the students explaining how they got to where they got to, tips, advice, networks they joined, specialist advice etc. Students then themselves to become role models in return to younger engineering students particularly after a field visit, work experience etc. They can talk about the course at recruitment events and in turn build confidence learning how to communicate with the public about who they are and what they do.



Partnership Meeting 3 – Participant Responses

Question regarding point 1.3:

Support in the field of access to education and increasing its quality (efficient education ecosystems in the field of entrepreneurship)

* We pay attention to what educational organizations and other organizations can do

1. What changes at the organizational and structural level in the region and Poland/Ireland/Turkey should be done to support female engineers on their way to running their own start-up business?
2. What changes should be implemented at the level of curriculum plans and fields of study at universities to support female engineers on their way to running their own start-up business?

Answers – Organisational & Structural Level Changes/Curriculum Changes

- **Female Engineering Support Networks** – graduates felt they are left to their own devices after college. Joining a female engineering support network and enterprise network suitable to engineers would be beneficial. Information about these networks, their focus are, supports and who they also work with would be beneficial. It was emphasised that the networks that would be most valuable would be enterprise development and those that existing engineering companies are already affiliated with.
- **Engineering Companies integrating with engineering students and graduates** – don't know how to reach out to female engineers and graduates. Unless female engineers approach, apply and specify they are female companies are none of the wiser. It would be beneficial if engineering companies had better access to female engineers and potential employees. It was recommended then the site visits could be part of their graduate experience and project content. This gives a valuable insight into what the company does, how it operates and what potential jobs are available in that particular company. Having a solid relationship and communication network with educational organisations is important particularly before graduates finish college.
- **Confidence, drive, passion and pushing forward** – ensuring females are equipped with both personal skills and educational skills is important for them to move forward and engage with potential engineering companies, employers and colleagues.
- **Work Experience** – the biggest challenge for female engineers is gaining work experience. Many spend hours researching and applying for internships or volunteered. The possibility of working with an engineering entrepreneur can help overcome challenges and barriers.
- **Have your say** – ensure female engineering students who are often very few don't feel isolated, experience jokes/remarks about being female. Make sure that lecturers give them a say and that they attain the respect of their male counterparts. This could include showcasing



powerful or famous female engineers as examples in the studies showing a balanced field of play between male and female engineers in the external world.

- **Balanced gender module topics and content** - Include in the teachings it is important to know how to communicate with both male and female by including communication skills modules and role plays. The women in the classroom will be seen as useful to their learnings and a good way for in turn for the men to learn how to communicate to women. Particularly when learning the different challenges when communicating with different genders, cultures, nationalities etc. Make sure female students are seen as an important addition and included in all teachings.

Support in the use of innovative teaching methods

- What changes could support the creation and dissemination of the use of modern teaching methods for this purpose?
 - * both questions in relation to:
- Formal education (at schools, colleges, on-line courses) - content and methods
- Practical education (practice, learning through action)
- Career paths (creation of own enterprises, entrepreneurial activities inside existing organizations)

Answers – Innovative teaching methods

- **Include Continuing Professional Development** introduce new teaching and learning modalities that would enhance STEM education. Use digital technologies to enhance learning and promotion of engineering careers and methods to enhance the engagement of students in engineering and entrepreneurship subjects. Digital technologies can include conference calling programs, remote telescopes, remote laboratories etc.
- **Educate students in career titles/roles/entrepreneurial profiles** many students just focus on the subjects rather than the job and how they can use these subjects to develop a career or become an entrepreneur. Again get real engineering professionals from different engineering roles and backgrounds to come in and showcase what they have done and how they achieved it.
- **Include Specialist STEM Champions/Educators/Recruiters**– to work with colleagues, external organisations and individuals, research, disseminate insights and best practices to the broader educational network. This will ensure continuous professional learning and align with the outside world and their needs. Assessments delivered can reflect with inquiry based learning and what has been delivered by STEM Champions.
- **Recruitment of gender balance educators** – try to recruit a balanced number of both female and male educators and employees.

- **STEM Event** – where STEM organisations, entrepreneurs and individuals are invited to the colleges and universities to showcase their companies, what they do, engage in recruitment/work experience/internship etc. This should include Leaving Cert students who are planning on doing higher level engineering to get them started on an informed foot.
- **Organisational Partnership support** – set up a collective crowd funding with a set of agreed, specific initiatives consistent with the recommendations of recruiting, supporting and enabling female entrepreneurs. To pool resources, mentoring, philanthropy, crowdsourcing, netowrking over five years to begin with.

Commitment to our Partnership and Action Plan

At the outset Momentum organised a written pledge to contribute to the development of Irish EMERGE Regional Partnership and our wider objectives and our commitment ot action. In conjunction with our EMERGE international partners, we devised a Signed Declaration that reflected the core objectives of the partnership and what we are working to achieve.

REGIONAL PARTNERSHIP COMMITMENT			
Declaration			
<p><i>The European Commission has agreed to provide support from the Erasmus+ Programme for establishment of the EMERGE Regional Partnership in Leitrim, Ireland.</i></p>			
<p><i>The Partnership comprise stakeholders from VET and Higher Education Institutions, engineering enterprise and economic development sectors drawn from public, private and non-profit organizations, who are committed to increase number of female entrepreneurs in engineering by transforming their access to and the quality of the training and their carrier pathways.</i></p>			
<p><i>The aim of this Partnership is to strengthen the knowledge triangle between education institutions, SMEs, and employment support organizations. By building a sustainable collaborative relationships and making cooperation a key feature of knowledge economy, the traditional barriers for female engineers in entrepreneurship can be broken down, and this way the potential of regional SME sector can be enhanced. One outcome of this will be development of Action Plan, which will contain concrete individual and collective commitments to improve access to and quality of support from the entrepreneurship education ecosystem for women in engineering.</i></p>			
<p><i>We are in support of the afore-mentioned aims and are prepared to:</i></p> <ul style="list-style-type: none"> • <i>Support the formative assessment of current skills gap and existing learning pathways for female engineers education system in relation to entrepreneurship;</i> • <i>Propose recommendations regarding innovative pedagogical approaches and education activities directed to development of entrepreneurial competities of female engineers;</i> • <i>Propose recommendations and take actions to improve access and quality of support from the entrepreneurship regional ecosystem for women engineers, including internships, business incubation, coaching, mentoring, access to necessary resources for business development, etc.;</i> • <i>Develop established Partnerships in order to sustain and increase results achieved.</i> 			
Name	Organization (name and address)	Contact information (e-mail)	Signature



While we cannot share the Signed Declaration due to GDPR considerations, we are very proud to have gained the commitment of 17 stakeholders through this undertaking, this intervention instigated an interest from the outset and actually getting people to sign a ‘Declaration’ meant they were aware of, engaged in and committed to the delivery of the project.

IRISH PARTNERSHIP

Role of Momentum Ireland undertook the following roles in order to optimize impact in the short and long term:

- ✓ Communication
- ✓ Meeting facilitation
- ✓ Meeting discussion evaluation
- ✓ Project promotion and integration of partner promotion capability

On a practical level, the roles can be outlined as:-

Communications	<p>MMS was responsible for coordination of communication among participating stakeholders as well as enabling outward communication to wider stakeholders in general. They also ensure coverage in both social and traditional media, coordinating both images and content development.</p> <p>Momentum provided graphic design to the Partnership ensuring all materials follow the EMERGE brand guidelines and the Erasmus+ logo is included on all materials developed for the region.</p>
Meeting facilitation	<p>MMS was responsible for meeting agendas, facilitation and logistics (meeting spaces, technical support, catering etc), as well as circulating key documents. MMS recorded all partners discussions and responses to meeting specific project questions.</p>
Exploitation	<p>Subsequently, Momentum will show leadership to the other partner members by promoting the use of the EMERGE resources widely throughout their networks nationally e.g. the network of 31 Local Enterprise Offices in Ireland have a mandate to train new and emerging entrepreneurs, through Women in Business networks and through key European education channels e.g. EfVET and UIIN.</p>



THE ACTION PLAN

In Ireland, the vested stakeholders have agreed to implement the following actions:-

Action 1 Awareness Building

In Ireland, it is important to inform, and influence policymakers of the exciting opportunities presented through women entrepreneurs in engineering. Hence, an Information PowerPoint and a project brochure was prepared early in the project lifecycle, which was widely circulated to increase support and knowledge, to get the message out, clearly outlining

- What is the EMERGE Erasmus+ project and partnership?
- What we want to make happen?
- Who stands to benefit?
- What is our project's "unique selling proposition"?
- Why are we credible?

Awareness building actions will see us make numerous presentations at the highest possible level with a major emphasis on briefings to Government ministers and key regional decision makers and influencers. Entrepreneurs and teachers (at HEI and VET) also need to be informed about the EMERGE project and the platform for application. We will use the following communications channels:

- Online interfaces (its website, Facebook page, Twitter channel)
- Online advertisement
- Encouraging the applied participants to share their own participation on their social portals
- Informing the management of each faculty through the central educational and/or marketing directorate
- Informing our target groups in person

Action 2 Delivery of the START UP IN STEM classroom course

We will deliver the EMERGE classroom course in the ETBs, Sligo IT, Letterkenny IT, and annually thereafter, which may take various forms, for example:

- Part of an existing course
- Online course
- Workshop
- Competition (for students and/or entrepreneurs)
- Summer school

- 
- International Week course

Momentum will also add the course to their training portfolio

Action 3 Host a powerful Multiplier event to launch the EMERGE outcomes

The National Showcase Multiplier Event will be a key event in the delivery of the EMERGE project and will play a very important role in sharing the outputs of the project. Our Partnership will use the opportunity to launch the EMERGE course and share the learning of the learnings of the partnerships. It is planned as a regional impact event and will bring bringing together decision makers, industry support bodies, educational organisations, female engineering entrepreneurs and SMEs and female engineering students to explore and commit to actions that could be taken in our Region to roll out the project.

The Multiplier Event is scheduled for 2020 invitations will be issued with a target of at least 50 attendees. The event will feature inspiring engineering entrepreneurs and include those who participated in the Irish EMERGE Placements.



SUSTAINABILITY

The Irish EMERGE Partnership will maintain a number of outcomes after the project funding lifetime ends. We however also believe that it is about 'sustain' over 'maintain'. To ensure that the project sustains after the end of the project and creates the impact expected, five main strategies will be implemented. Momentum will endeavor to achieve these strategies while ensuring a strong and sustainable future for its outputs is achieved. EMERGE has built a rich set of resources designed to stimulate more business starts by women in engineering. Momentum will ensure that this project is unique here in Ireland due to its integration with regional dimension for greater effectiveness in impact and sustainability.

The main Strategies of Sustainability employed include the following

Project Website/Online Platform

The project website will be maintained and updated for at least 3 years after the project end, so that interested stakeholders have access to the main deliverables of the project, fostering the easy implementation of the results. After the project has been completed, the IOs will form a large part of Momentum's training portfolio. We will continue to access and develop materials and networks created by the project, using them directly and adapting them to the needs of future research proposals. The ability of partners to keep the website active as a repository of EMERGE materials long after project completion, will provide stakeholders with a reason to keep returning to the site.

WISE Irish VET Partnership

All our EMERGE Partnership members have already expressed interest to work together to create a more entrepreneurial environment for women in engineering, including young women graduates. Our partnership will continue to exist after the project ends and will be driven by the individual stakeholders and we are committed to actively calendarize meetings after the official closing date of the project. We will continue to support the partnership and grow same on an annual basis.

Support services contact points

Momentum will act as the national contact point for the EMERGE project post funding,

Sustained dissemination

We will continue to promote EMERGE outputs post funding including convening or attending 1 – 2 national/international conferences or seminars to disseminate the project.

IPR Agreement

Momentum will enforce the Partner Intellectual Property Rights (IPR) Agreement, to establish partners' intellectual rights and ensure open access to digital resources, even after funding period is completed