



DI-MESH

(Digital Innovation for Manufacturing Engagement and Skills Hub)



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Scotland

Cyber-Physical Systems/Internet of Things (CPS/IoT)

The DI-MESH project is led by the Advanced Forming Research Centre at the University of Strathclyde in partnership with Scotland's economic development agency, Scottish Enterprise, and Scotland's Innovation Centre for Sensor and Imaging Systems, CENSIS. The project has created the business case for a new Digital Innovation for Manufacturing Engagement and Skills Hub (DI-MESH) in Scotland which will provide a new support mechanism for Scottish manufacturing SMEs to enable them to improve competitiveness and connect into new supply chains through the adoption of CPS/IoT technologies.

The Need

- Scotland's traditional manufacturing industries have experienced a sharp decline in recent years and there has been a marked shift towards a service-based economy.
- Despite this decline, Scotland's manufacturing sector currently employs over 168,000 people within 8,462 manufacturing companies, a large proportion of which are SMEs.
- Manufacturing is also responsible for 60% of all the region's exports, making it a vitally important sector for the Scottish economy.
- The UK currently lags behind other European nations in terms of the uptake of Industry 4.0 technologies amongst manufacturing companies and Scotland, as a region of the UK, is no different in this respect.
- Contributing factors include:-
 - A general lack of awareness of the benefits of digital manufacturing technologies, particularly amongst SMEs.
 - Limited access to finance for capital expenditure.
 - The so-called 'skills gap', where the skills required to successfully implement digital manufacturing technologies are lacking in the existing workforce.
 - For smaller companies, another barrier to implementation is the lack of a suitable ICT infrastructure and in-house ICT support.

The Solution

- CPS/IoT technologies are the most readily adopted new digital technologies becoming available as part of Industry 4.0, given their flexibility to prototype and then scale-up and the relatively low equipment costs.
- A feasibility and readiness analysis has shown that most of the key elements necessary to facilitate the adoption and implementation of CPS/IoT technologies amongst manufacturing SMEs in Scotland are present.
- These elements need to be brought together and SMEs in the region made aware of their existence — this will be the primary mission of the DI-MESH hub.

Services

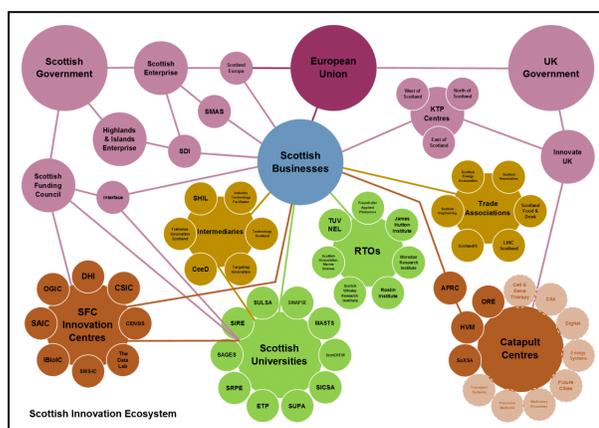
- Awareness raising activities — these will also target finance providers, as they must be made aware of the need for investment in digital manufacturing technologies.
- Education and training — developing and

running workshops/short courses on:-

- CPS/IoT and related digital manufacturing technologies.
 - Digital business models to encourage SMEs to think differently and consider changing their business model.
- Technology demonstrators.
 - One-to-one support for the adoption of CPS/IoT technologies. This will include:-
 - Initial assessment of the company's manufacturing operation to determine suitability for CPS/IoT technologies.
 - Identification of potential commercial solution providers.
 - Assistance with the specification and implementation of appropriate CPS/IoT solutions.
 - Assistance with business planning and raising finance for capital expenditure.
 - Stimulation, facilitation and coordination of RTD projects for new CPS/IoT solutions.

Core Partners

- The Advanced Forming Research Centre at the University of Strathclyde (AFRC).
- Scottish Enterprise (SE), Scotland's economic development agency.
- CENSIS, Scotland's Innovation Centre for Sensor and Imaging Systems.



- The AFRC is one of seven technology and innovation centres which together make up the UK High Value Manufacturing Catapult and is the only HVM centre located in Scotland.
- The AFRC and SE are also supporting the Scottish Government in the creation of a National Manufacturing Institute for Scotland (NMIS). This major initiative is currently at the planning stage, providing an opportunity for DI-MESH to influence the final shape and help ensure that NMIS resources can be fully

utilised in order to enhance the DI-MESH services offered.

Financial Plan

- Initial soft start: very low headcount to deepen understanding of the market and develop management/marketing approaches.
- Year 1: leverage proportion of existing personnel, equipment & facilities to vastly reduce financial burden on hub thus minimising risk.
- Year 2: dedicated space and staff implemented, this is assumed to be within planned National Manufacturing Institute for Scotland (NMIS).
- Year 3: central hub extended to incorporate two regional centres located within existing facilities.

Costs/Income (€) by Year	2017	2018	2019	2020	2021
Costs - Infrastructure	0	55,000	170,000	320,000	336,000
Costs - RDI personnel and project	0	45,000	82,500	149,775	189,201
Costs - Operational (Management, Admin...)	28,125	119,250	179,063	284,566	339,344
Costs Subtotal	28,125	219,250	431,563	754,341	864,545

Income - Commercial & Competitive Funding		20,000	70,000	200,000	400,000
Income - Sponsorship		10,000	20,000	40,000	60,000
Income - Membership		10,000	20,000	30,000	40,000
Income - Regional State Support	28,125	179,250	321,563	484,341	364,545

% Income from Regional State Support	2017	2018	2019	2020	2021
	100%	82%	75%	64%	42%

Next Steps

- As many of these activities will align with the activities of the Scottish Government's new National Manufacturing Institute for Scotland and NMIS is still at the planning stage, it is not currently possible to finalise every aspect of our plan. However, there are a number of tasks that can be progressed while plans for NMIS are in the process of being finalised. These are:-
 - Put in place a consortium agreement to formalise the relationship between the core partners.
 - Re-convene DI-MESH Stakeholder Group and run a workshop with this group to; (i) refine the proposed services described above (ii) further explore the relationship with NMIS, and (iii) map out in more detail what is needed to support Scottish manufacturing SMEs.
 - Develop a robust marketing and communications plan with clear/concise messaging which fully utilises the wider Scottish innovation ecosystem for dissemination and signposting.
 - Create a DI-MESH online presence.
 - Develop case studies/exemplar projects based on use cases to stimulate interest and build credibility.