Case study – The POLKA application

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POLKA – POLlution Knowhow and Abatement

H2020 – funded ITN (doctoral training network)

duration: 01/02/2019 – 31/01/2023 (plus six-month extension)

total value: €4.1million

15 PhD students, 10 partners

Topic:
Research to support the development of green combustion systems, in particular with hydrogen as fuel.

Partner search

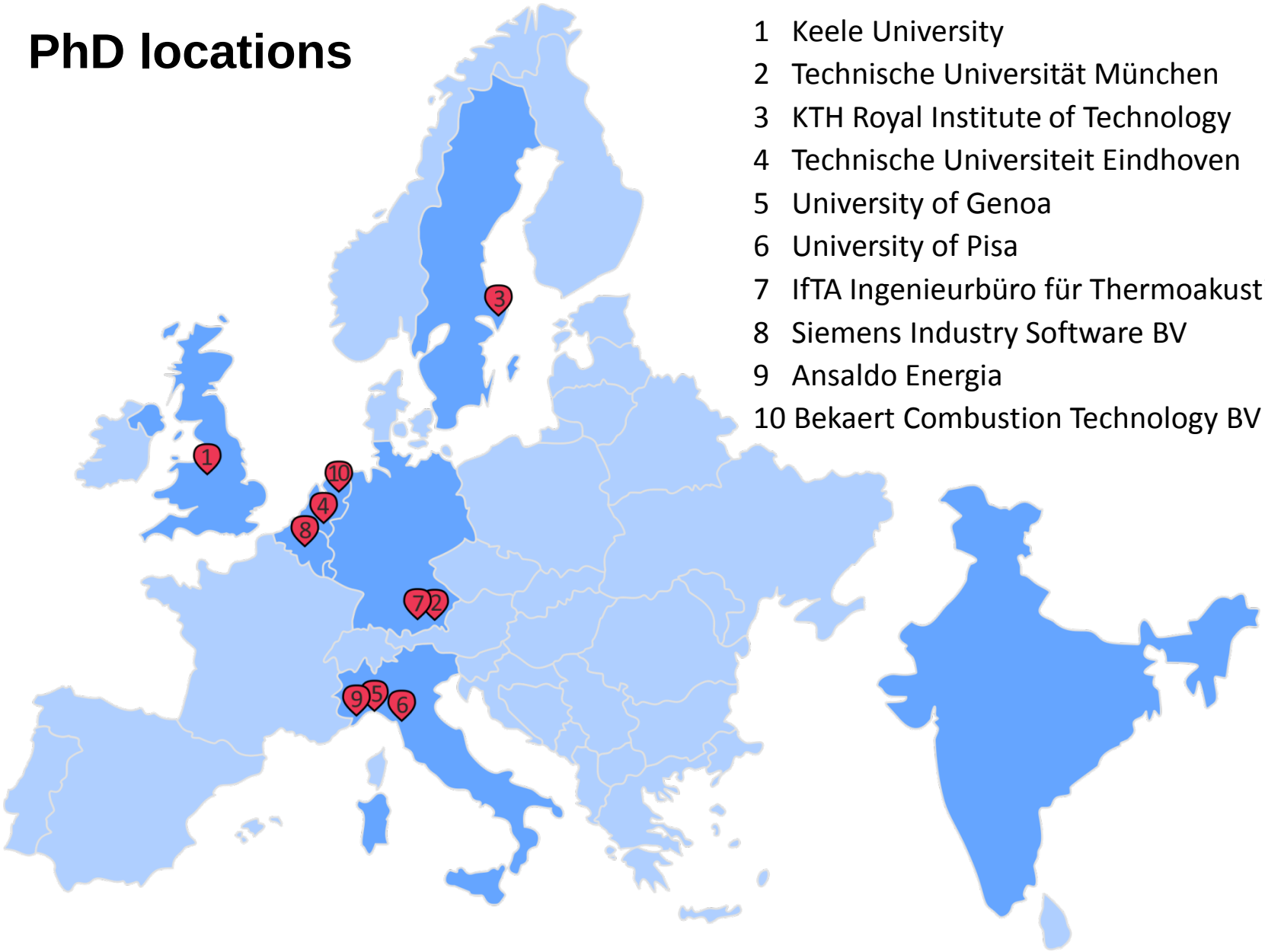
Approached existing colleagues (creative and responsive).

Sought personal recommendations from trusted colleagues.

Had face-to-face meetings with new partners
(no risks with unfamiliar partners).

Lots of “cold-calling” to find industrial partners – unsuccessful.

PhD locations



1 Keele University
2 Technische Universität München
3 KTH Royal Institute of Technology
4 Technische Universiteit Eindhoven
5 University of Genoa
6 University of Pisa
7 IfTA Ingenieurbüro für Thermoakustik GmbH
8 Siemens Industry Software BV
9 Ansaldo Energia
10 Bekaert Combustion Technology BV

Choice of research projects

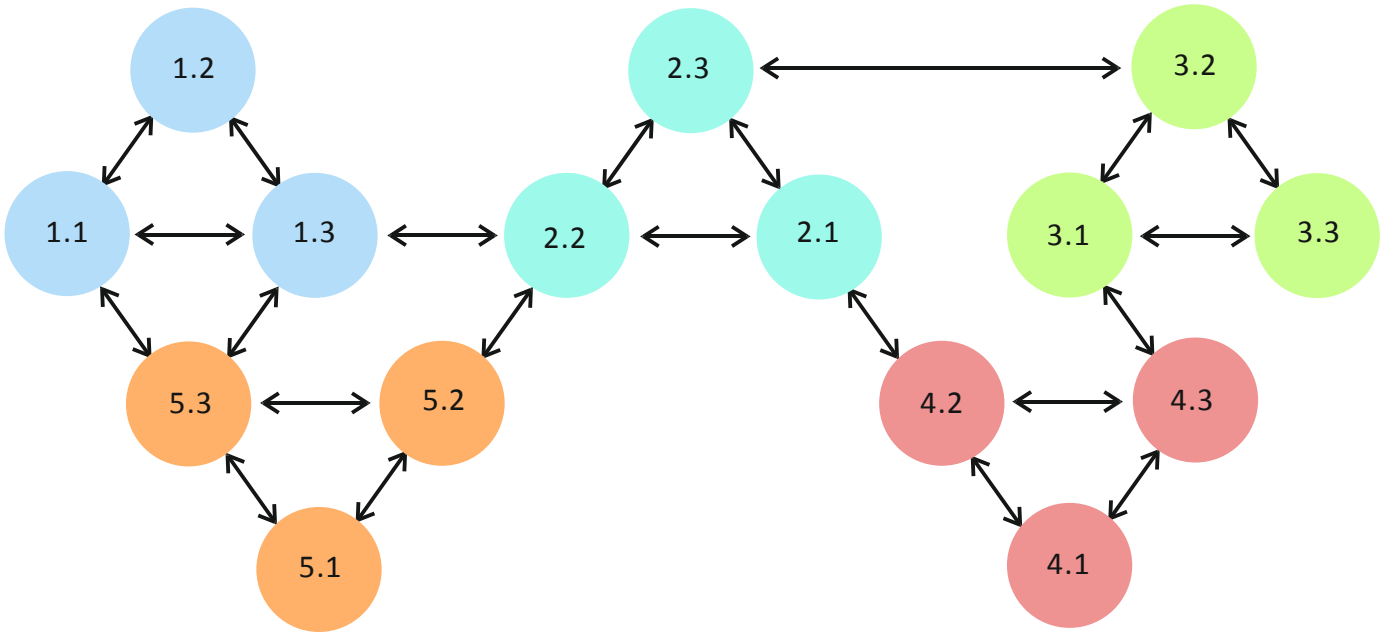
Identified core topic by brainstorming with colleagues from complementary disciplines and different EU countries.

Identified issues for industry.

Was involved in earlier MSCA networks and added new key elements to make the project distinctly different.


NOTE: PLEASE MAKE SURE ALL WINDOWS ARE CLOSED PROPERLY BEFORE LEAVING TO AVOID BEES THRIVING INSIDE
(W-1) laminar equivalent of (W2)
(S1) Laminar dump combustor
fund. experiments microphone, chemil.
fund. analytical PIV / LDV, nonlinear dynamics
appl. study of precursor to blow-off
Exptl data + analysis of thermoacoustic instability leading to blow-off in a laminar dump combustor
input
validate
(M1) Laminar dump combustor
input velocity field
G-equation
Green's function
(fundamental)
→ heat release law
deliverable: analytical model for low d comb
(M3)? turbulent equivalent of (M1)
(M2) analytical
(W1) numerical
model for realistic combustor with h.o.
(S2) Turbulent swirl combustor
fund. experiments flow vz, time history of p, Q
impedance at inlet (vortex shed.)
appl. study of precursor to instability and blow off
fund. analytical nonlinear dynamics
Exptl data + analysis of thermoacoustic instability leading to blow-off in a turbulent swirl combustor
input
validate
(W2) numerical studies (LES, CFD...)
relating to turbulent swirl comb. (fundamental)
System ID, low-order models (applied)
(J1) Studies to develop early-warning system (very applied)
(SG1) Cold-flow shear layer dynamics
exp. naturally-hot & and forced hydrod. field
theory
laminar
turbulent
(fundamental)
(I1) Microperforated plates
- study damping mechanism at lets (fund)
- investigate suitability as damper (applied) in combustor
(S-1) Non-normal and nonlin dynamics of thermoacoustic system

Work packages and PhD projects



WP 1: Passive instability control

WP 2: High-resolution simulations for hydrogen combustion

WP 3: Analytical simulations of nonlinear interactions

WP 4: Early detection of instabilities and flashback

WP 5: Boiler design

Extracts from the evaluation report

Strenghts

The objectives of the research programme are well presented.

The innovative aspects of the training programme are clear.

Gender aspects are considered in the training curriculum.

The non-academic partners play a relevant part in the research

The beneficiaries are internationally recognised researchers.

Weaknesses

The role of the researchers in communication with the general public is not sufficiently specified.

The promotion of keystone results towards policy makers is not sufficiently focused.

Total score: 93.80%

Tips for proposal preparation

A “good story” is essential.

Face-to-face discussions are vital.

Visiting potential partners requires time, mobility and funds.

Convening a conference session helps to meet potential partners.

Industrial partners are hard to find – invite them early!

Academics close to retirement are a good source of information

Be prepared to deal with uncertainties and unexpected events.

Misunderstandings can occur because different disciplines and different countries have different “cultures”.

Copy/paste from earlier proposals does not work.

Thank you!

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