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Innovation within an Entrepreneurial University Adapting to Industry 4.0 and other Challenges

Zhejiang University
22 November 2015

Bill Glew, Director Postgraduate Programmes, Aston Professional Engineering Centre, Aston University, UK.

www.aston.ac.uk

4 Part Presentation Structure

1. Brief recap of last year
2. Challenge 1: departmental organisation innovation
3. Case study 2: learning paradigm innovation
4. Case study 3: strategic objective innovation

1. Aston University

- Based in Birmingham, the UK's 2nd largest city.
- Founded in 1895 and a University since 1966.
- A reputation for teaching excellence, applied research, and graduate employability.

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1. The City of Birmingham

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1. Five Executive Schools

Aston Business School

Consistently highly ranked overall, as well as top ranking MBA and MSc programmes in both UK & Europe

School of Engineering & Applied Sciences

Leading edge engineering and applied science education since 1895

School of Life & Health Sciences

UK leading research and teaching within areas of pharmacy, optometry, biology, psychology, neurology

School of Languages and Social Science

Range of professional English language programmes, French, German, Spanish, translation, international relations, sociology

Aston Medical School

A new School starting in 2015 with the ambition to train local doctors taken from hard to reach local communities.

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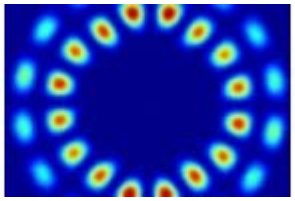
1. School of Engineering and Applied Science

- Six Subject Groups:
  - Chemical Engineering & Applied Chemistry
  - Computer Science
  - Electronic, Electrical and Power Engineering
  - Mechanical Engineering & Design
  - Engineering Systems and Management
  - Mathematics

- & Aston Professional Engineering Centre (APEC)





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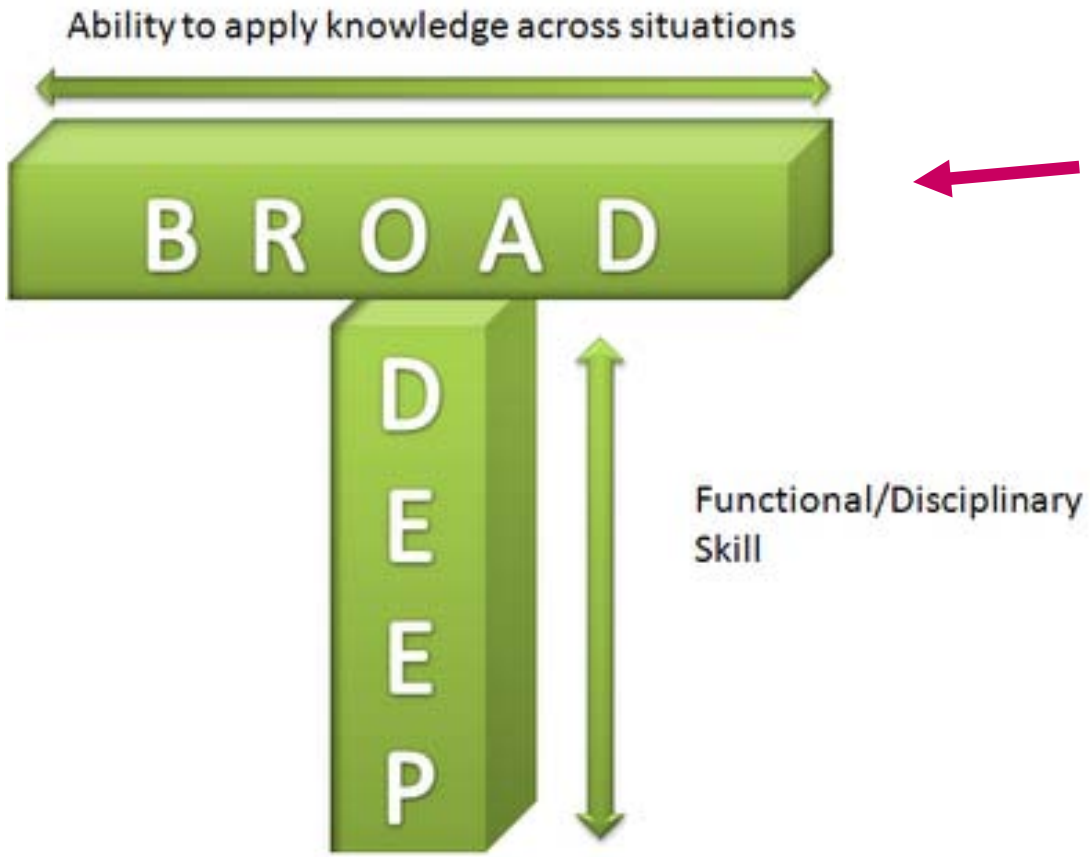
1. The UK's Engineering Talent Shortage

- If the UK is to remain one of the world's top manufacturing economies it needs more engineers.
- The forecasts are that Britain needs around 90,000 new engineering graduates every year.
- And nearly half of all employers say current graduates are not skilled enough.

1. We need T-shaped engineers



1. Engineering Council

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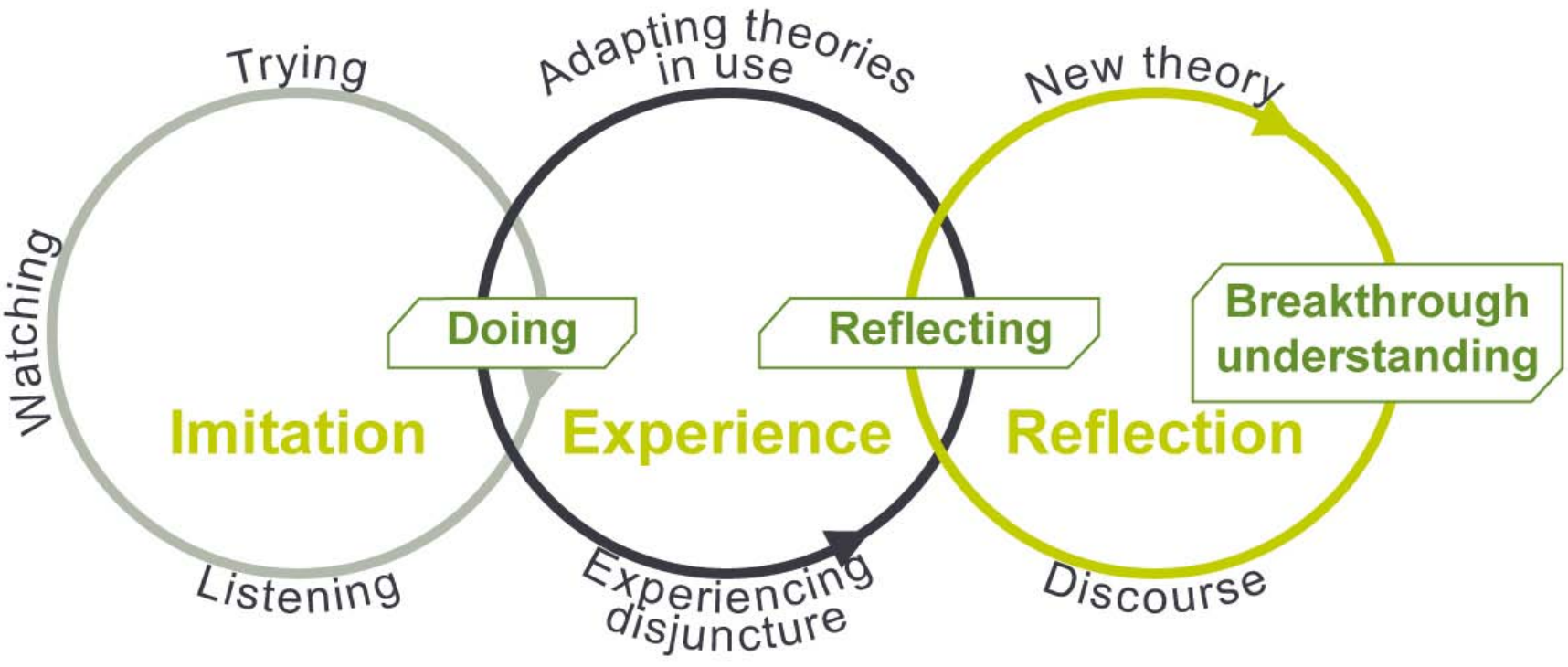
1. Engineering Gateways Project

- Started in 2006.
- Sponsored by UK Government.
- Objective to find a way to create more better qualified engineers.
- The project would bring together a group of universities, the professional bodies and employers to develop new approaches.
- The plan was to use work base learning as a means to both widen access and accelerate engineering talent development.

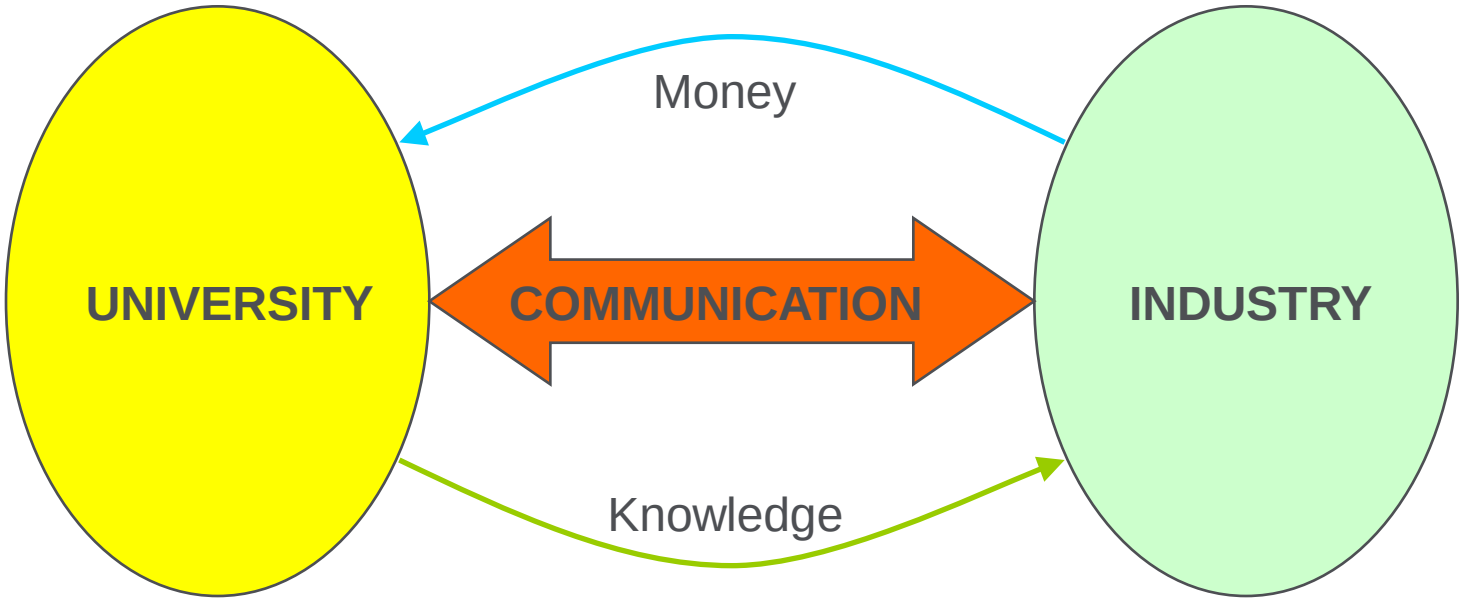
1. Key Features

- A series of real work projects instead of classroom based study.
- Participants are working whilst studying so the learning takes place in the workplace.
- Concurrent academic learning and engineering competence development in a single programme.

1. Triple Mode Learning



1. Traditional Industrial Collaboration Model



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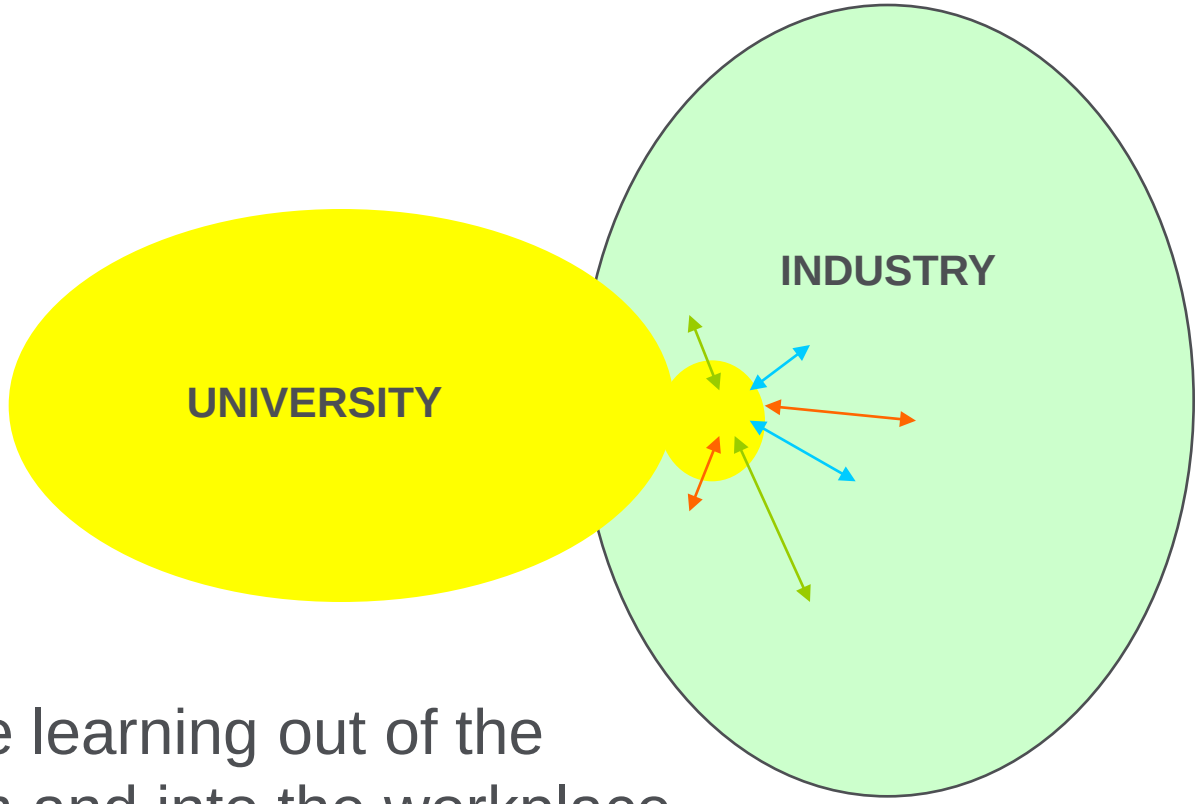
1. Professional Engineering Model



Taking the learning out of the classroom and into the workplace.

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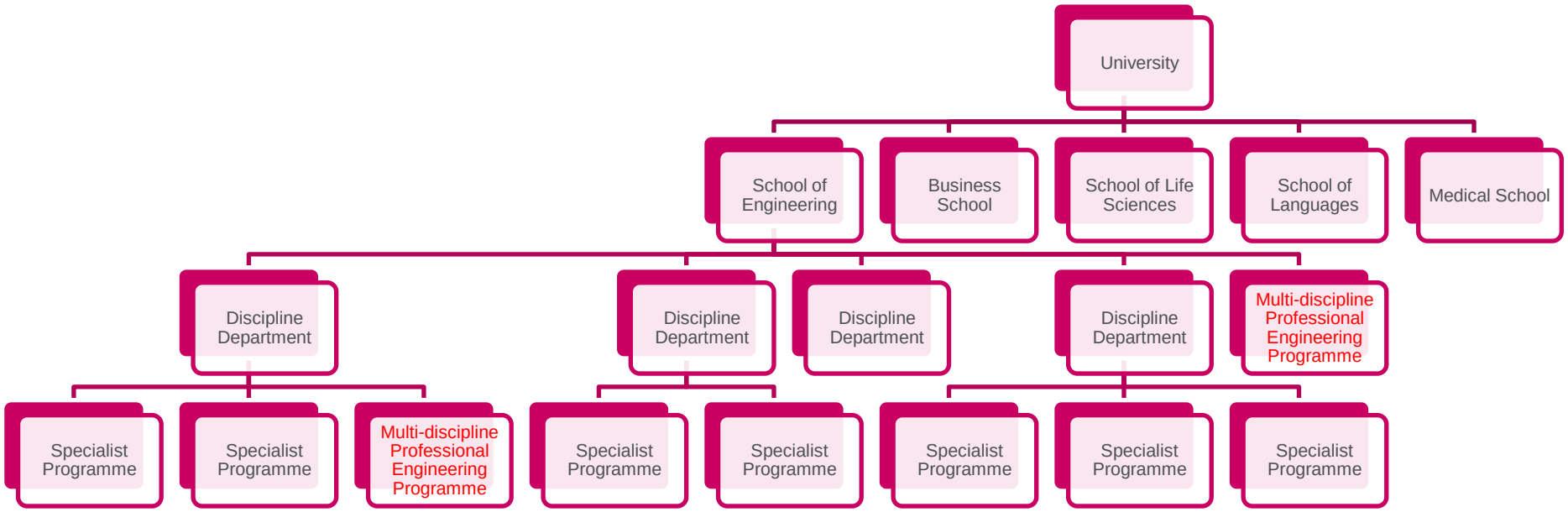
2. Challenge 1.

- *How to organise a traditional university teaching structure built around traditional teaching methods so that it can deliver high quality programmes using very innovative learning methods with a very different approach to learning and teaching?*

2. Organisational Structure (2010-2013)



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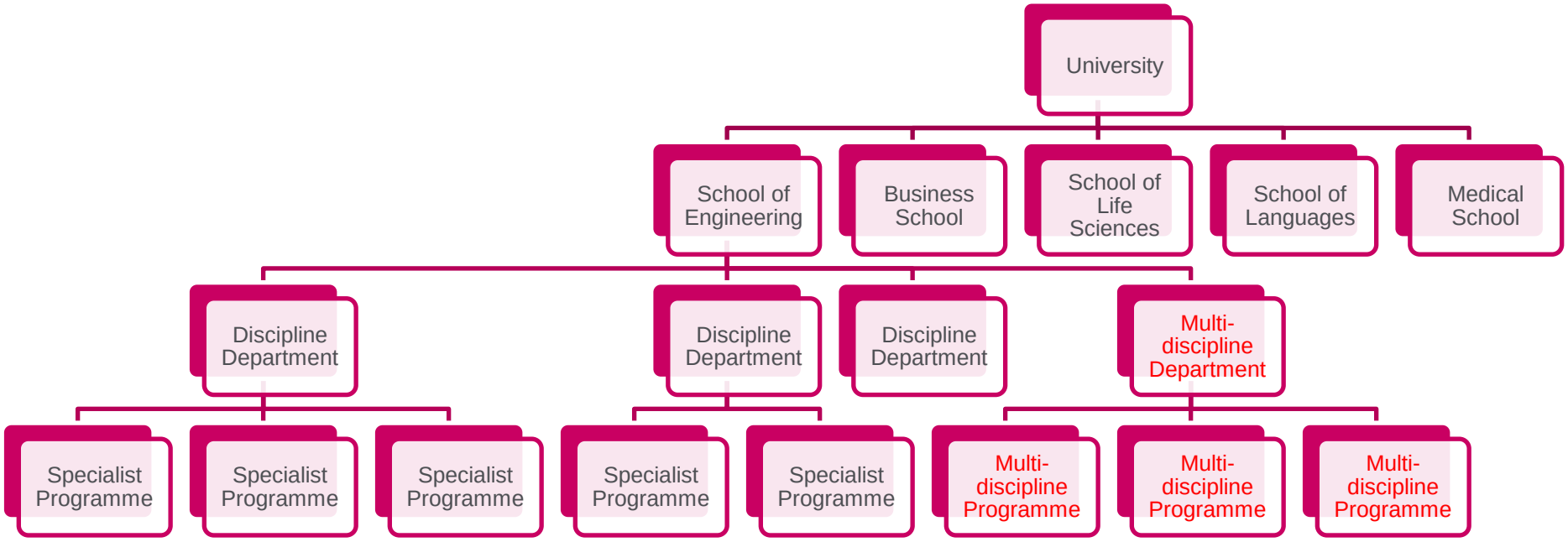
2. Traditional Structure Problems

- Insufficient scale in each multi-disciplinary programme
  - 40 to 100 students on each in departments with 500 + students
- Incoherence between programmes.
  - For student
  - For staff
    - Academic, professional & administrative
  - For employers
- No single strategic direction

2. Option One



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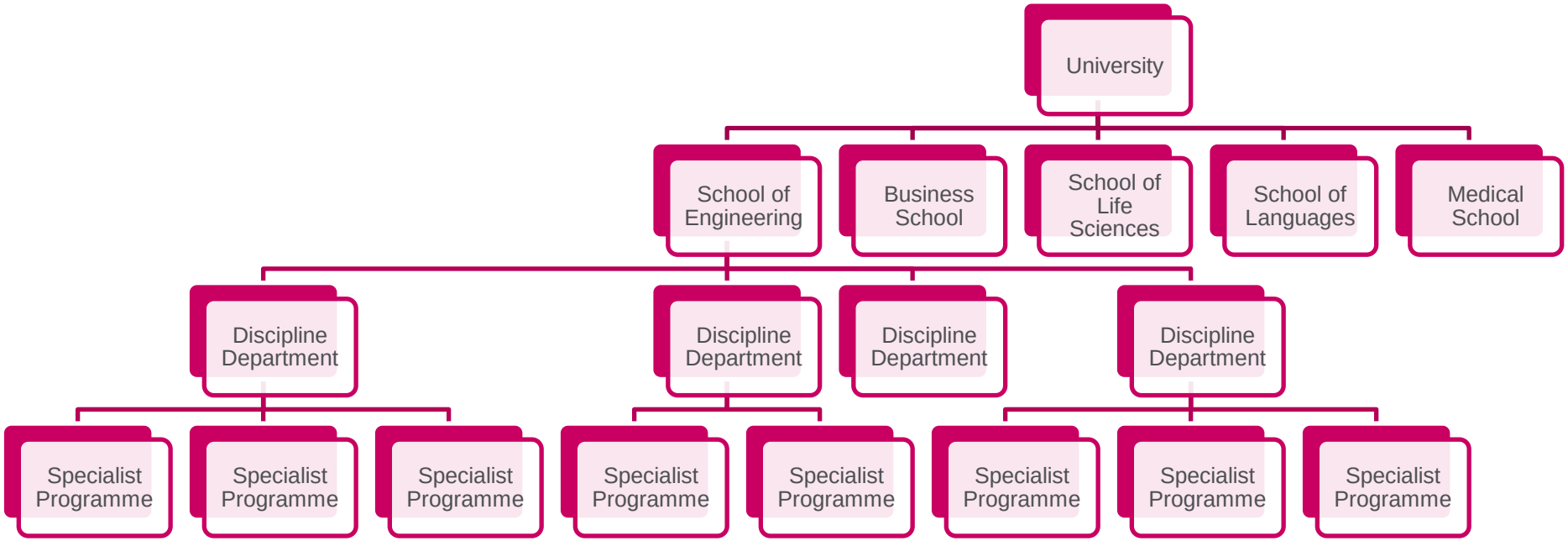
3. Option Two



Multi-discipline Outreach Programmes = APEC

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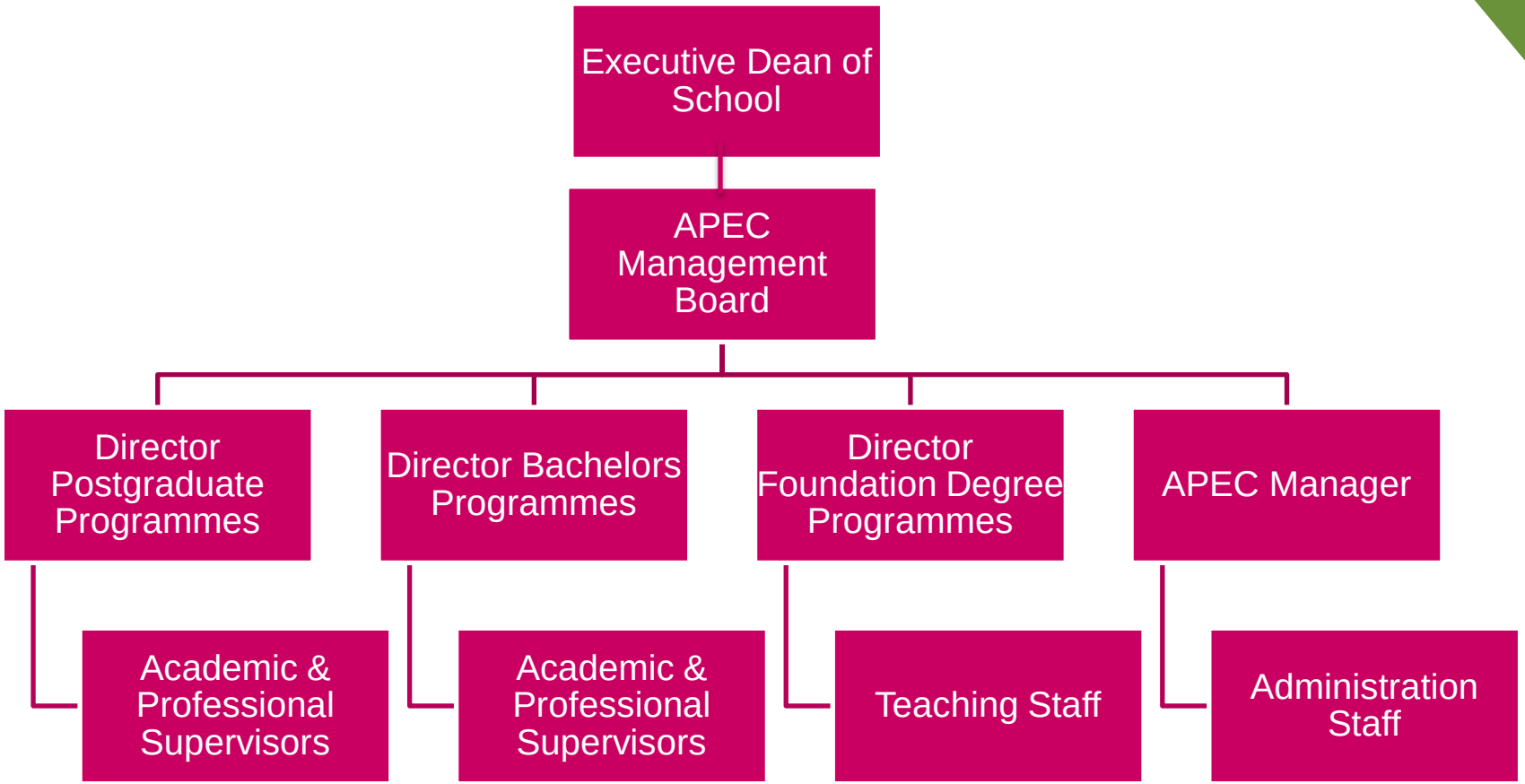
2. Aston Professional Engineering Centre



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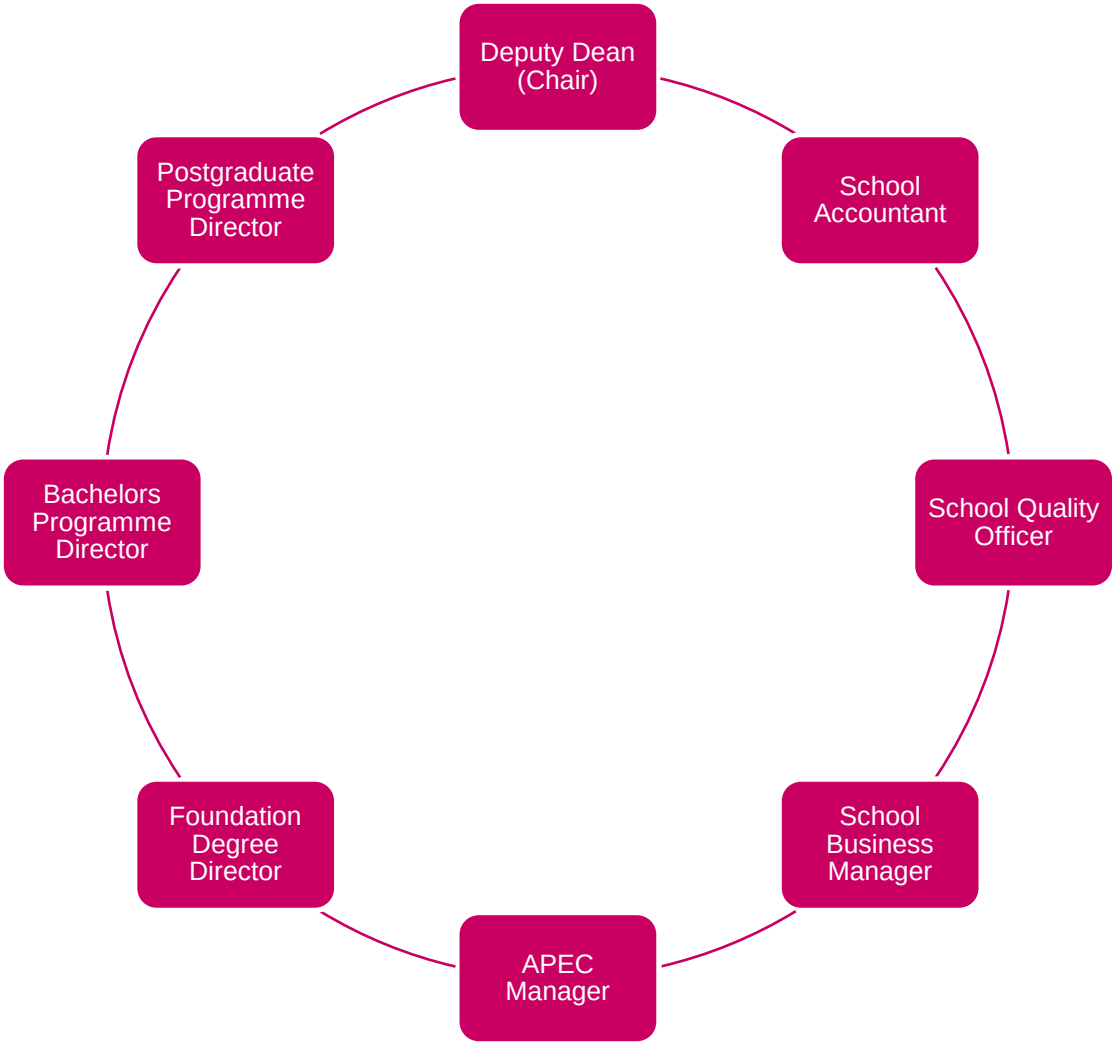
2. Management Board



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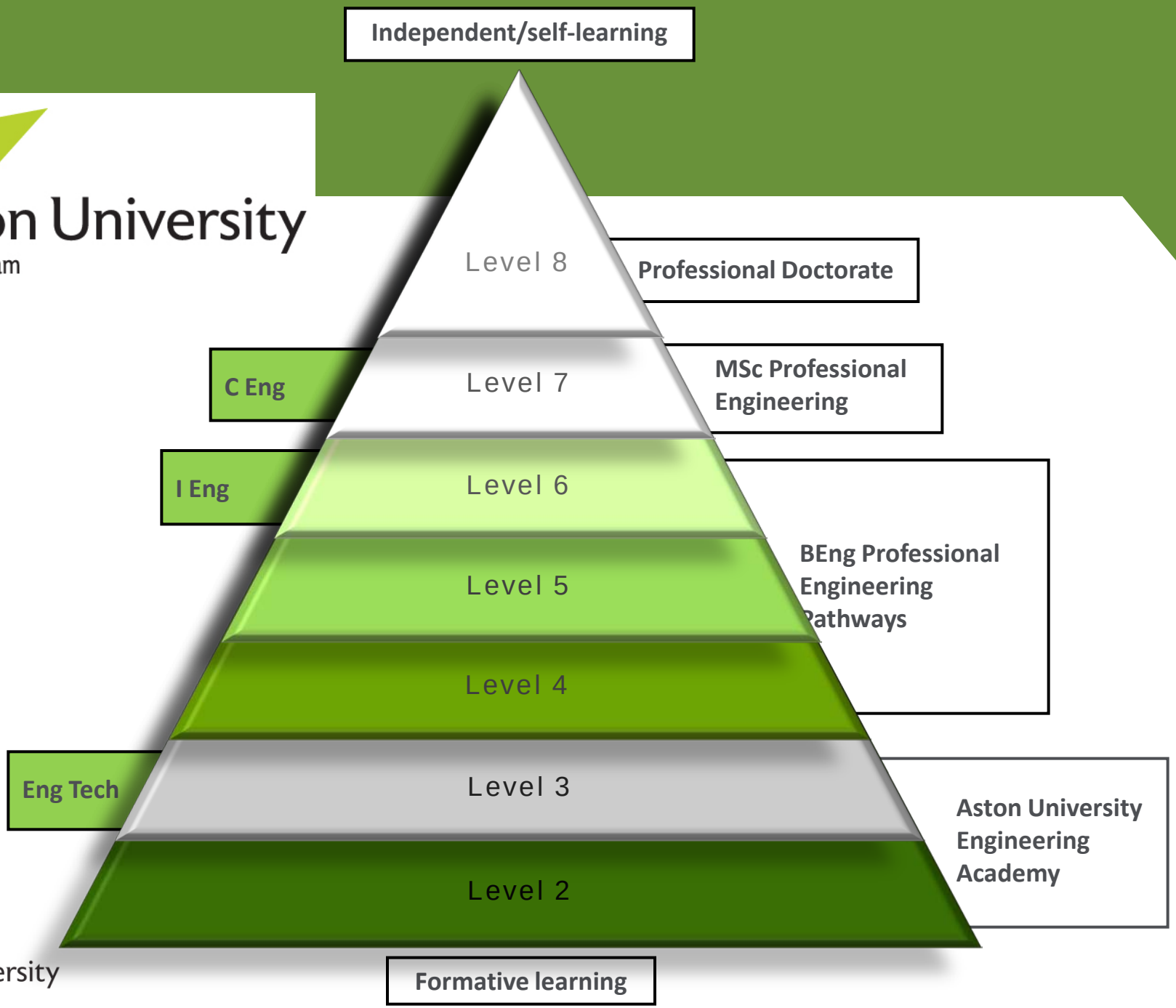

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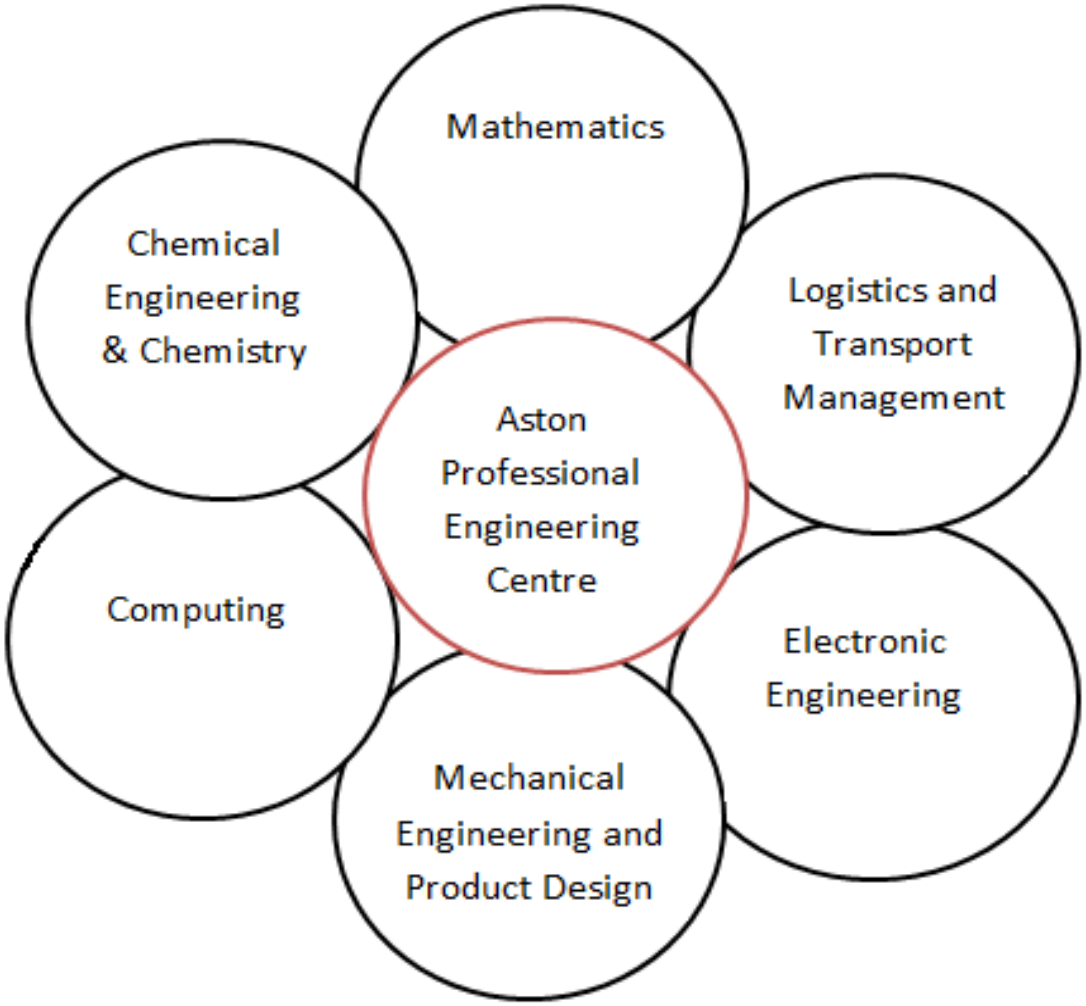
2. Leadership's View



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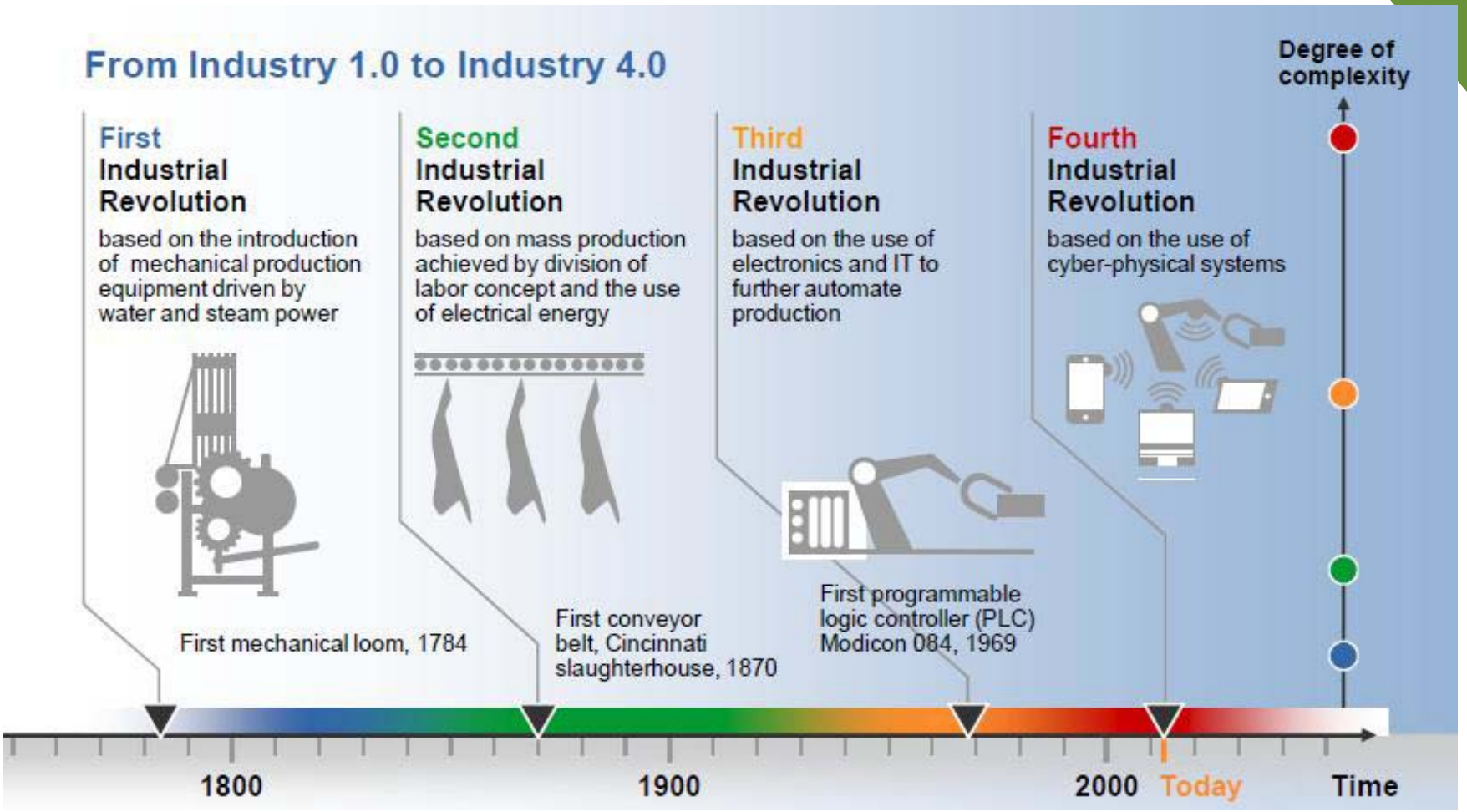
3. Challenge 2:

- *How can the university provide industry with a engineering talent pipeline that will meet the needs of Industry 4.0?*

3. 4th Industrial Revolution



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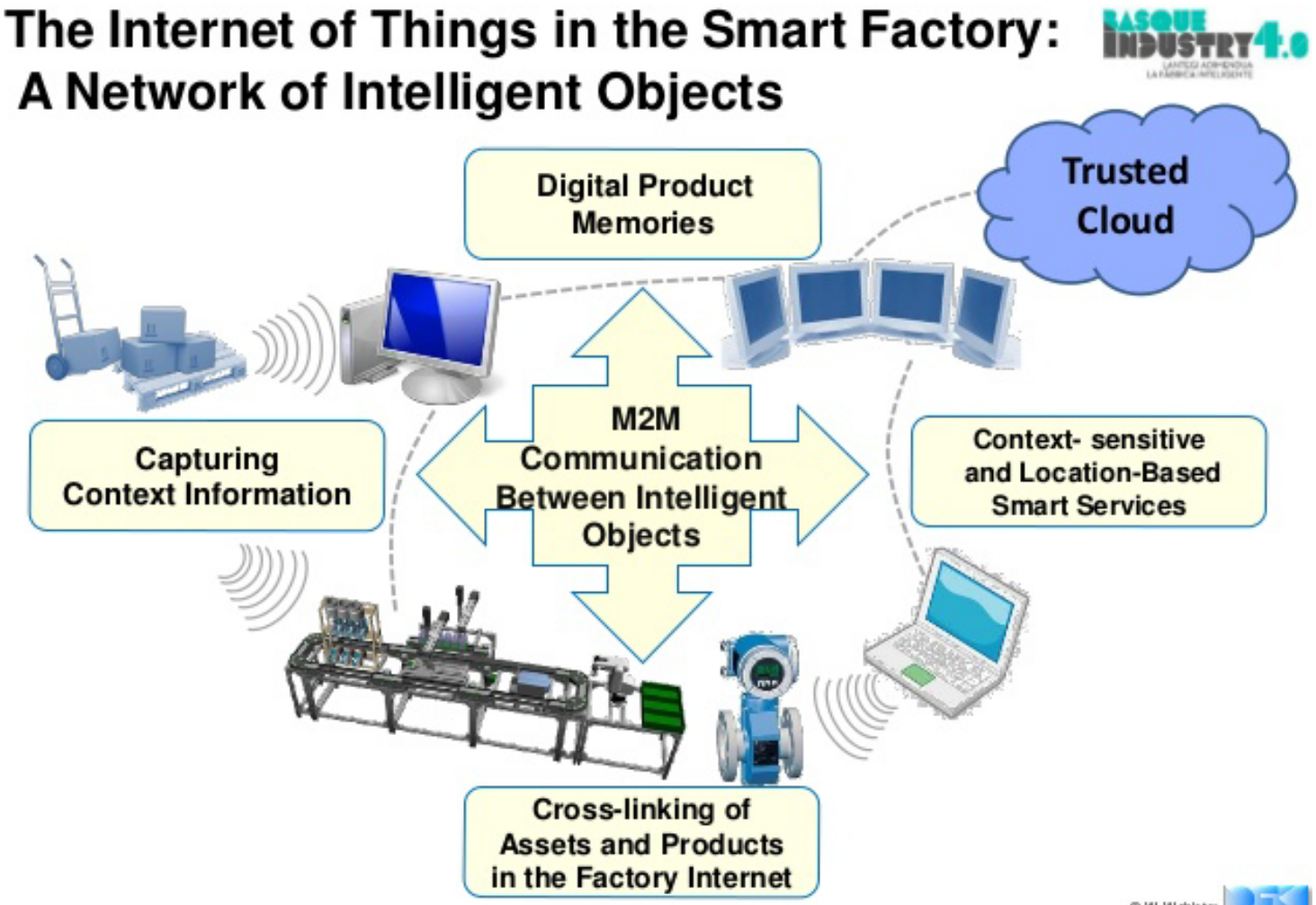
3. Industry 4.0 = *"The integration of cyber-physical systems with the internet of things".*



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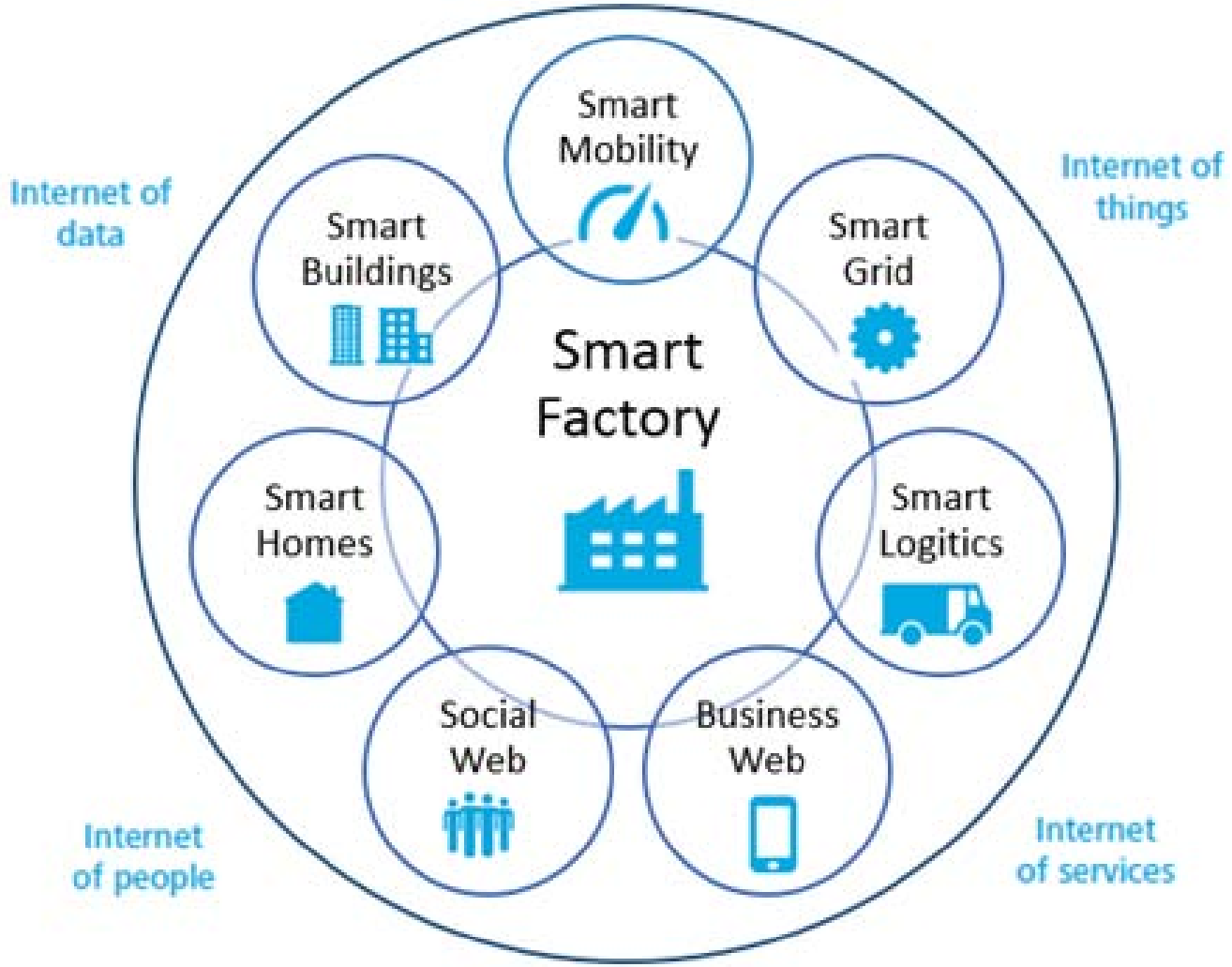
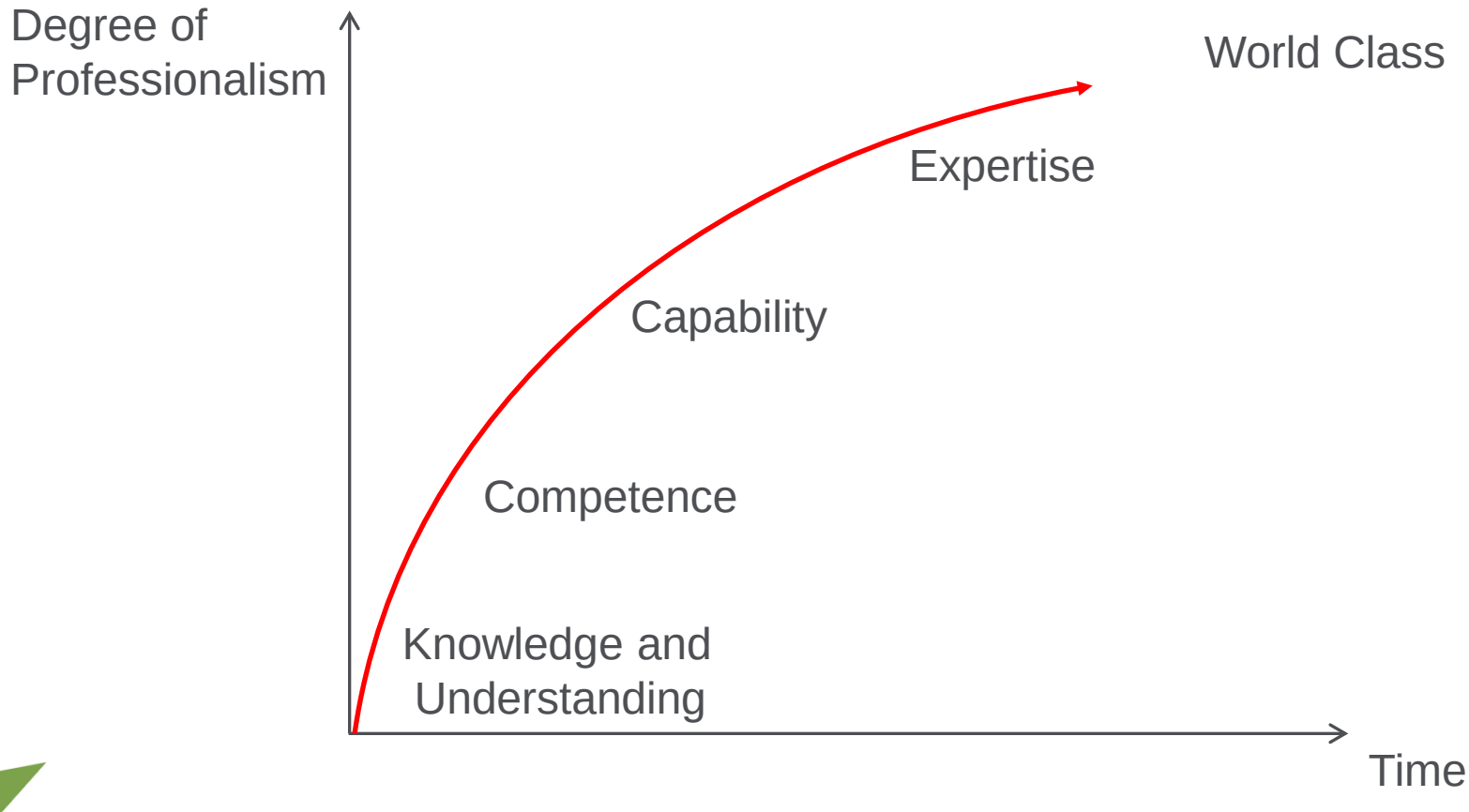
3. The Dawn of the Smart Factory



3. The Skills & Knowledge for Smart Factories

- Technical (Hard)
  - IT and digital
  - Data information processing and statistical
  - Organisational and procedural
  - Interdisciplinary
  - Knowledge management
- Personal (Soft)
  - Time and self management
  - Adaptability
  - Team working, social & communication
  - Mind set for continuous learning & improvement
  - Entrepreneurial

3. Talent Pipeline Curve



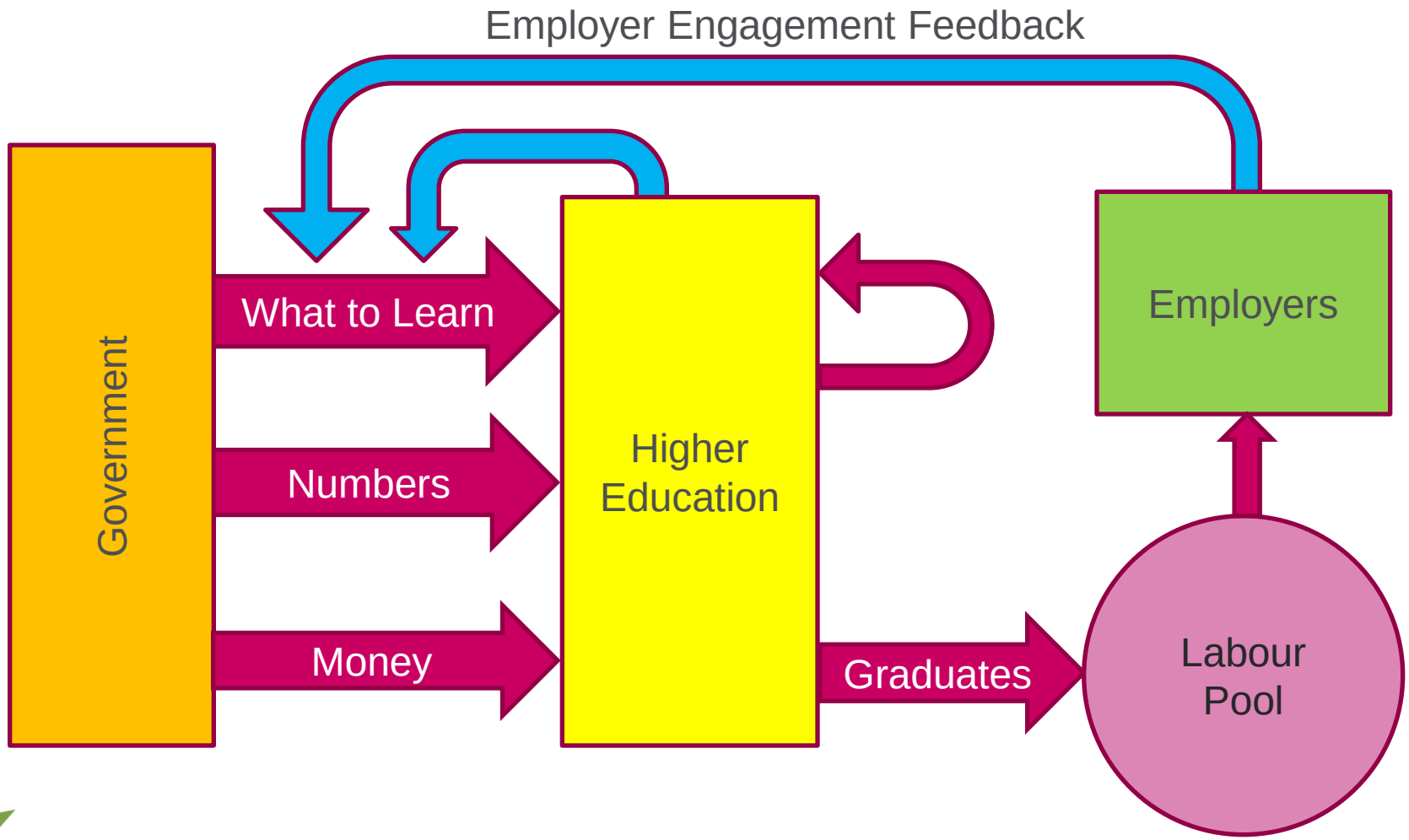
3. Skills Shortage Paradox

- The UK is producing a lot more graduates than in the past, so many that a lot of them are unemployed, and yet we still have a skills shortage !

3. The engineering skills gap problem

- Our analysis is that this arises from a fundamental problem with our educational system.
- We have a 20th century industrial era (at best) educational system trying to operate in a 21st century global economy era.

3. Traditional “Push” Education System



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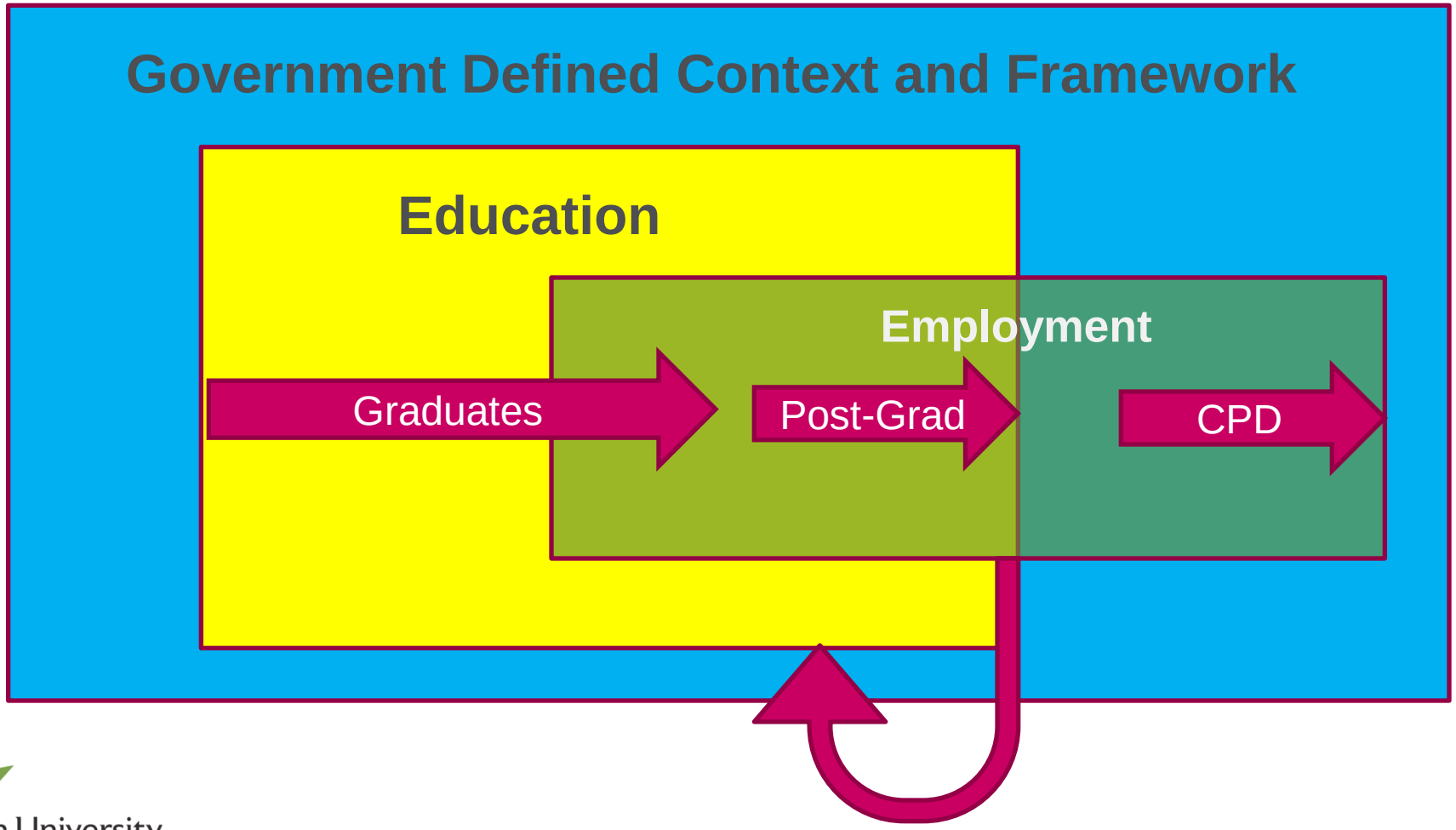
3. Push Education

- Government decides what it thinks should be the target level of higher education participation.
- Government and/or faculty decide upon what should be taught within programmes.
- Where employer engagement is active this will include consideration of feedback from employer of education. This feedback may or may not be accurate.
- Efficiency of education is the priority.

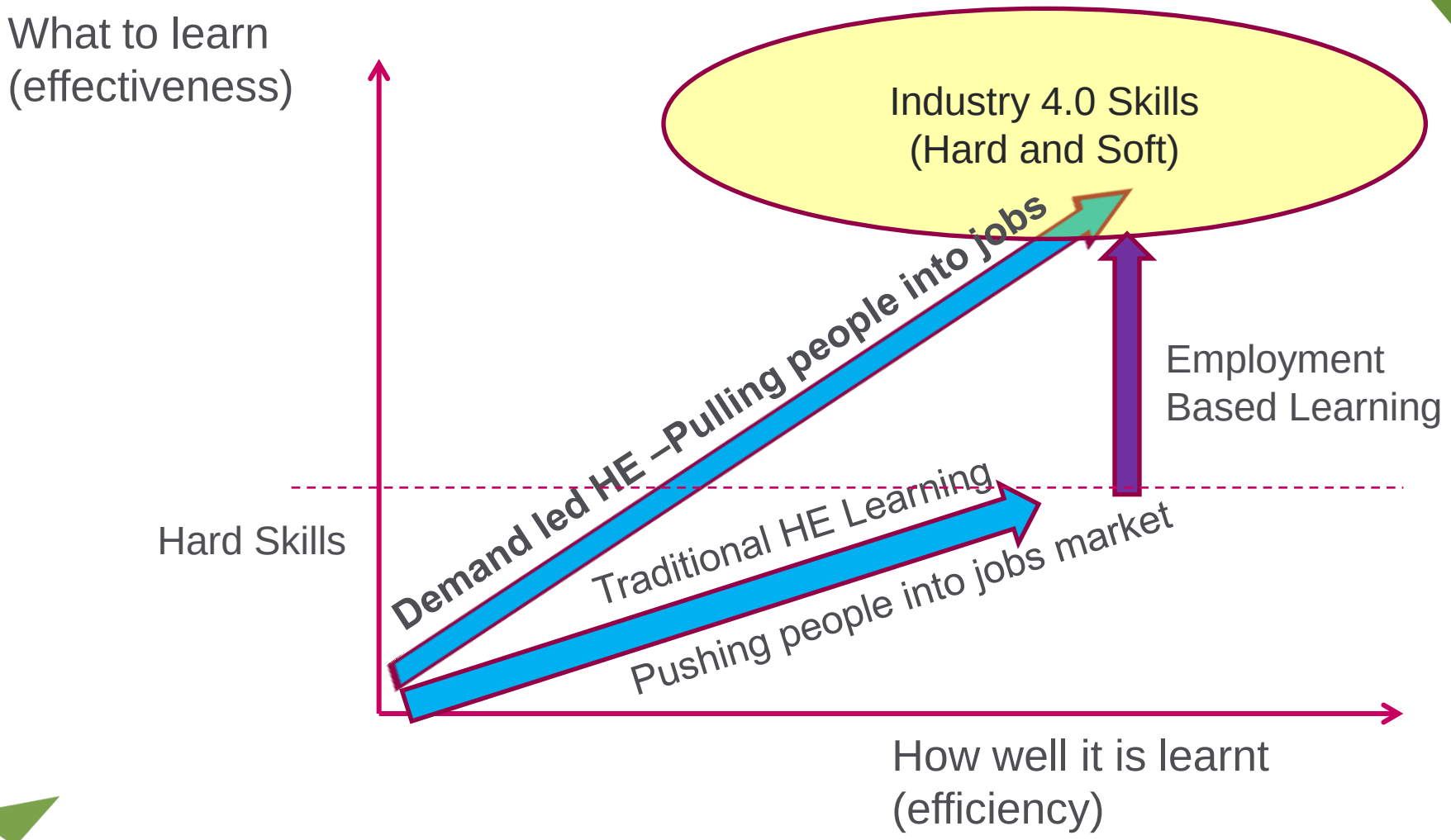
3. “Pull” Education



3. Pull Education

- Education programmes tailored to individual requirements.
- Mass customisation.
- Concurrent development of hard and soft skills.
- Chunking of programmes down into shorter blocks to reduce lead times.
- The effectiveness of education is the priority.

3. “Voice of The Customer”



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4. Challenge 3.

- *“How do we, as the educators of tomorrow’s engineers, ensure that they are sufficiently skilled to deliver the low carbon targets the world needs.”*

4. Let’s Try Something

4. Carbon Week

http://www.aston.ac.uk/carbonweek/

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4. 1: All 2000 2nd Year Students

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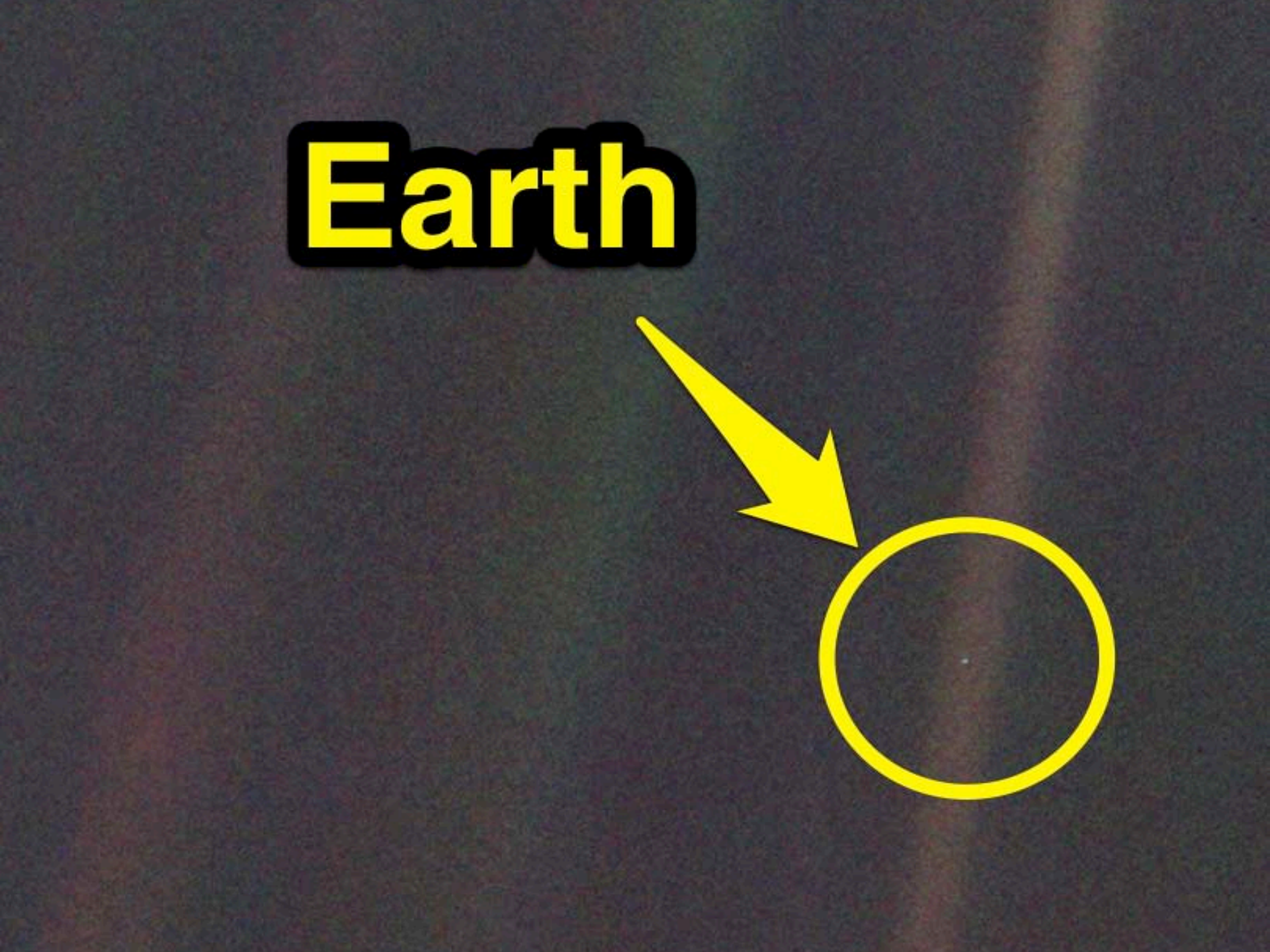
4. The Choice is Ours

2% or 4% ?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