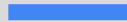


# Creating STEM power

Professor Lord Bhattacharyya  
Founding Chairman WMG



# Vocational Learning

**Currently not well regarded!**



**Only one-quarter of parents** judge vocational education to be worthwhile (Edge Foundation, 2014).



**41 out of 73 colleges** have difficulty offering work experience in some curriculum areas: "by far the biggest issue is lack of employers and capacity issues" (Institute for Public Policy Research, 2014, p.34).



**65% of teachers** would rarely or never advise a student to take an apprenticeship if they had the grades required for university entry (NFER 2014).

"Regardless of job or supplier, the keys are to **get employers involved early, emphasize learning through practice and simulation, and assess proficiency on the basis of skill demonstrations to ensure that graduates are ready to work**"

**McKinsey "Can China close the skills gap?"**

**"Vocational Education needs curriculums and assessments that replicate the uncertain, messy, problem-based, people intense, and time limited world of work."**

**Nancy Hoffman**

where Work  
is the Focus

# Global Trends

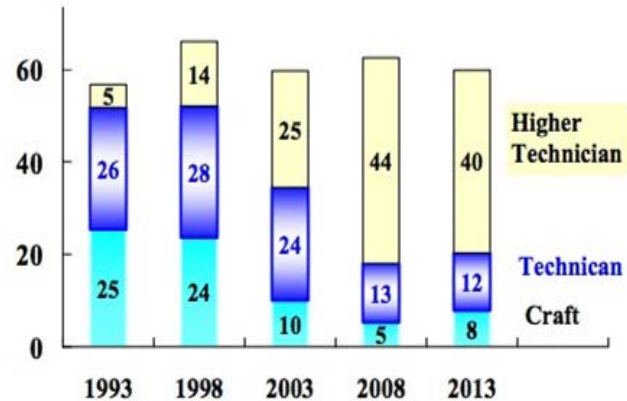
## Huge Demand for Skills

### IN CHINA:

At the high end of the labor market, despite the remarkable increase in the number of tertiary graduates in the last decade, the demand for skilled labor is likely to outstrip the supply by 24 million people in 2020.

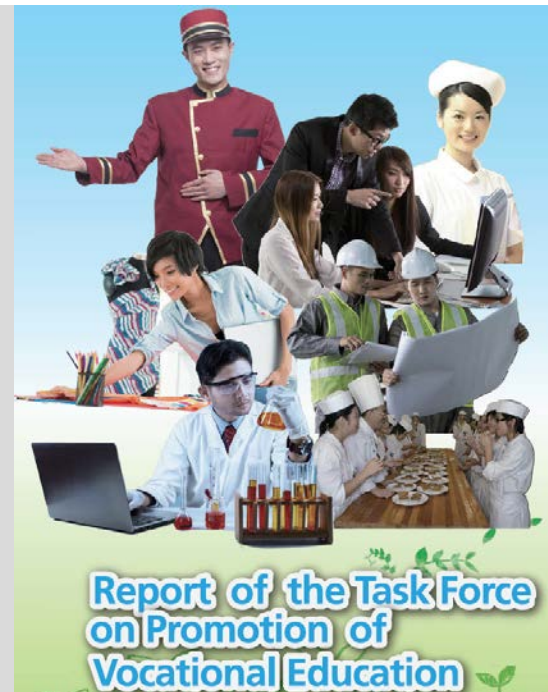
### IN THE EU:

Nearly two-thirds of overall employment growth forecasted in the “technicians and associate professionals” category. The same category currently represents only 15% of EU employment.



Notes: Craft courses are courses beyond secondary 3 level, while higher technician courses are courses at

## Change in Hong Kong vocational course level



Local Answers

# STEM Need

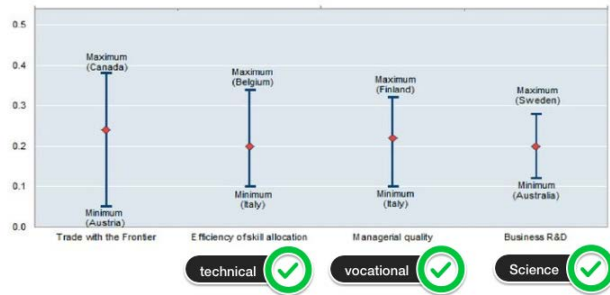
## Huge Range of Sectoral Skills are Required

- Automotive
- Digital Security
- Medicine
- Agriculture

## STEM needed for productivity growth

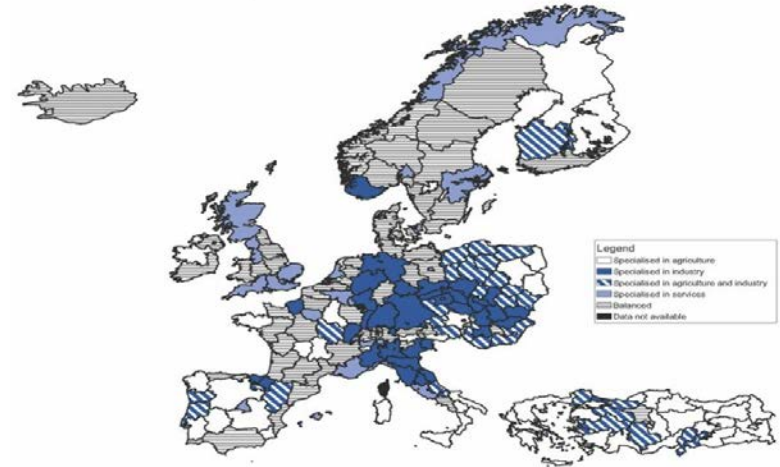
### STEM Education - key to productivity Growth

Estimated frontier spill-overs (% per annum) associated with 2% point increase in MFP growth at the global frontier



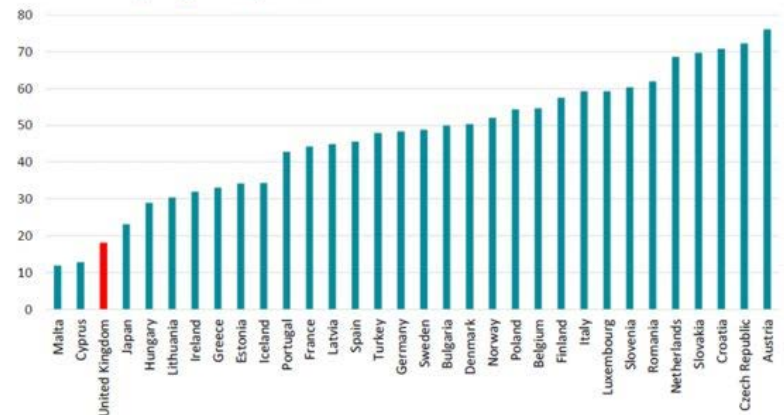
source: OECD

## Sector Skills needed vary by region



Source: OECD calculations based on Eurostat (2015), "Regional labour market statistics".

## Vocation education enrolment by nation too



# STEM Supply





**WMG NATIONAL AUTOMOTIVE INNOVATION CENTRE, UK**

# Start Early

***“Where the required skill is rare or new, don’t wait for the next generation to grow up and get interested: get to them while they are still in school”***

**McKinsey “Can China close the skills gap?”**

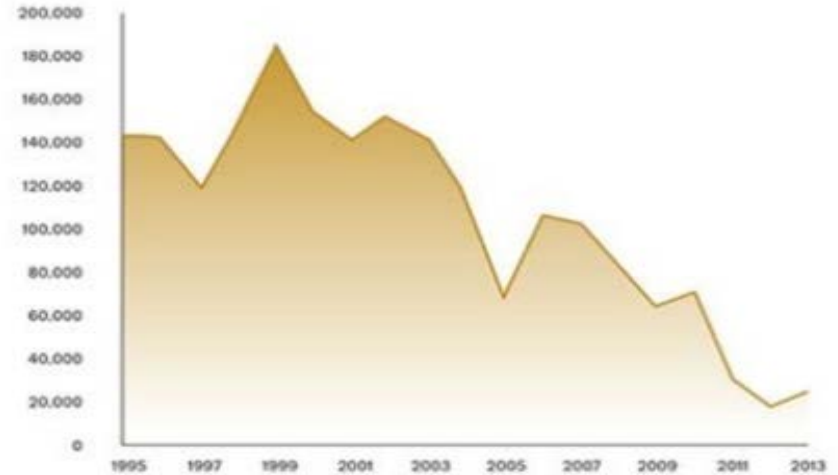


**WMG Academy for Young Engineers**

**WMG Applied Engineering Programme**

Online undergraduate programme for staff in industry. Integrating innovation, research and education, studied at the workplace.

Chart 3: Training for those in work has dropped off sharply



Source: Office for National Statistics, Labour Force Survey.

“My reasons were practical when I decided to study while working. I wanted to get the tertiary education I didn’t have - and my job demanded it,” says Chow. “I think my biggest gains were the recognition and opportunities I was given at work for showing commitment through my studies.”



**Chow Yat-Fat - Open University of Hong Kong**

Non-stop



# Higher Status



To handle the growth, JLR's workforce has expanded in five years from 15,000 to 42,000. Its recruitment of engineers has been so single-minded – 17,000 and counting – that the new demand has raised the traditionally low status of the profession in this country. “An engineer is no longer someone who mends your washing machine,” marvels one JLR ‘lifer’. “An engineer is someone who works on Jaguar’s fabulous new [electric I-Pace](#) that’s about to give [Tesla](#) a bloody nose.”

*“Metal melted to make swords, clay hardened to make vessels, chariots going on land and boats for crossing water - all these arts were the work of the sages”*

**KHAO KUNG CHI**



**Chelsia Lau**

Open to all

# An apprentice



**WMG Academy students**

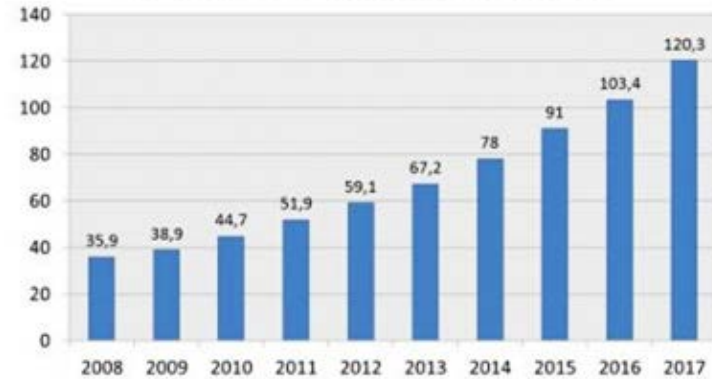
*“I could learn about veterinary somewhere else, but it wouldn’t come across as well as hearing it from a vet with his hand up the cow’s backside”*

## **Farming Apprentice**

*For me coming straight from industry, it’s being able to pass on that knowledge that it’s taken me 25 years to get.”*

## **Construction Tutor**

CHINA ONLINE EDUCATION USERS 2008-2017



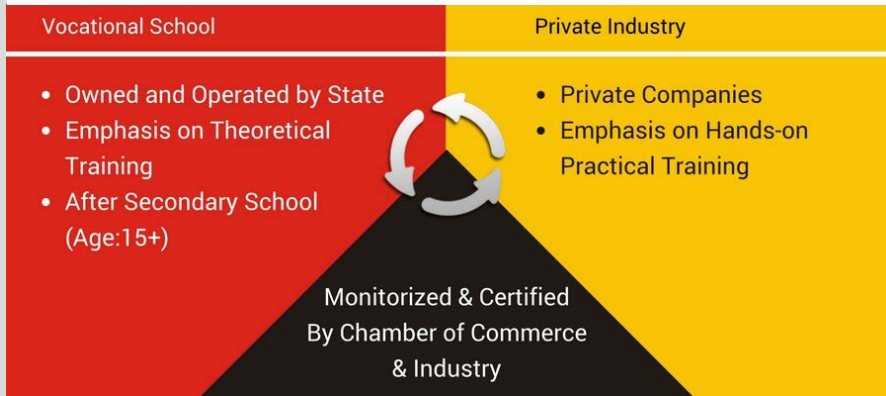
**Regius Professor Christofer Tomazou**

Success for life



# Vocational Strength

## German Dual System

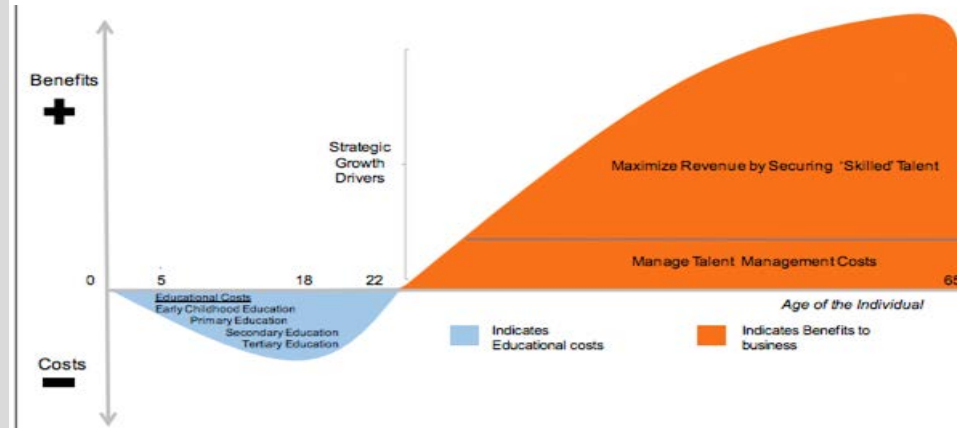


## Top 10 economies leveraging their human capital

Human Capital Index 2015	Global rank*
Finland	1
Norway	2
Switzerland	3
Canada	4
Japan	5
Sweden	6
Denmark	7
Netherlands	8
New Zealand	9
Belgium	10

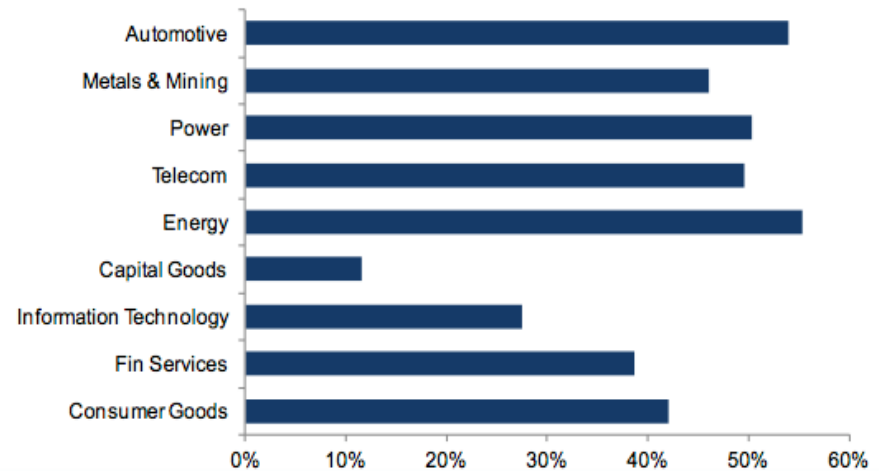
Source: World Economic Forum 2015

## Cost/Benefit Curve for business spend on Skills



## Rate of Return for business education investment

Figure 19. The Internal Rate of Return across Industries on Investments in Education



## Business Investment

## A vocation

I tell a student that the most important class you can take is technique. A great chef is first a great technician. 'If you are a jeweler, or a surgeon or a cook, you have to know the trade in your hand. You have to learn the process. You learn it through endless repetition until it belongs to you.

**Jacques Pepin**

"The path to the CEO's office should not be through the CFO's office and it should not be through the marketing department. It needs to be through engineering and design."

**-Elon Musk**  
*Engineer & Innovator*



## A mission