Creating STEM power

Professor Lord Bhattacharyya
Founding Chairman WMG
Vocational Learning

Currently not well regarded!

“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.
Huge Range of Sectoral Skills are Required

- Automotive
- Digital Security
- Medicine
- Agriculture

STEM needed for productivity growth

Sector Skills needed vary by region

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

Vocation education enrolment by nation too

Source: OECD
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.

Chow Yat-Fat - Open University of Hong Kong

“...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.”
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”

CHAO KUNG CHI

Chelsia Lau
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
Vocational Strength

German Dual System

- Owned and Operated by State
- Emphasis on Theoretical Training
- After Secondary School (Age: 15+)

Monitorized & Certified By Chamber of Commerce & Industry

Top 10 economies leveraging their human capital

<table>
<thead>
<tr>
<th>Human Capital Index 2015</th>
<th>Global rank*</th>
</tr>
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<tbody>
<tr>
<td>Finland</td>
<td>1</td>
</tr>
<tr>
<td>Norway</td>
<td>2</td>
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<tr>
<td>Switzerland</td>
<td>3</td>
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<tr>
<td>Canada</td>
<td>4</td>
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<tr>
<td>Japan</td>
<td>5</td>
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<td>Sweden</td>
<td>6</td>
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<td>Denmark</td>
<td>7</td>
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<td>Netherlands</td>
<td>8</td>
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<tr>
<td>New Zealand</td>
<td>9</td>
</tr>
<tr>
<td>Belgium</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: World Economic Forum 2015

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

<table>
<thead>
<tr>
<th>Industry</th>
<th>Rate of Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive</td>
<td>High</td>
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<tr>
<td>Metals &amp; Mining</td>
<td>High</td>
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<tr>
<td>Power</td>
<td>High</td>
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<tr>
<td>Telecom</td>
<td>High</td>
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<tr>
<td>Energy</td>
<td>High</td>
</tr>
<tr>
<td>Capital Goods</td>
<td>Medium</td>
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<tr>
<td>Information Technology</td>
<td>Medium</td>
</tr>
<tr>
<td>Fin Services</td>
<td>Medium</td>
</tr>
<tr>
<td>Consumer Goods</td>
<td>Low</td>
</tr>
</tbody>
</table>

Business Investment
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