Paradigm Reform of Engineering Education: New Demand, New Structure and New Model
工程技术教育的改革示范：新需求、新构架和新模式

smiths
bringing technology to life

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President of Asia
Smiths Group plc
史密斯集团亚洲总裁

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www.smiths.com

Smiths in China
史密斯在中国

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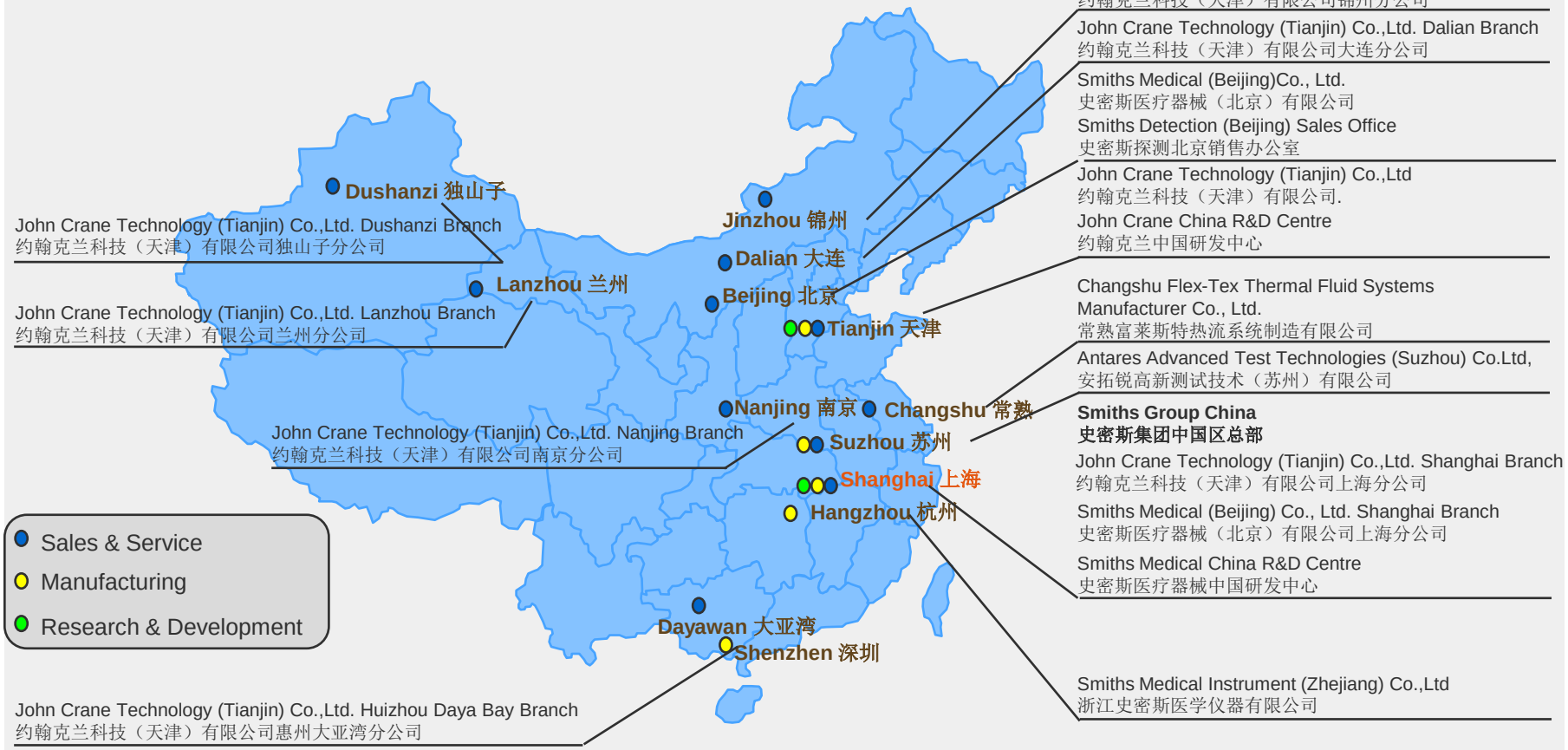
Smiths helps make China society safer, healthier and more productive. Through nearly 30 years investment and development, Smiths now operates from many locations in China, employing nearly 2,000 people.

史密斯集团助力使中国社会更安全、更健康和更高效。通过近30年在中国市场的投资和发展，史密斯集团目前在中国已有了多家企业和近2000名员工。



The Heritage: over 160 years continuous innovation
传承：160多年孜孜以求的不断创新

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Bringing technology to life to help to make the world safer, healthier and more productive.
我们将科技带入生活，并致力于打造一个更安全，更强健并更卓有成效的世界

We've been at the forefront of technology for over 160 years and our products and services continue to touch the lives of people every day
在过去160多年里，我们一直处在技术的最前沿，我们的产品和服务每天都在不断触及人们的生活

1851 – Samuel Smith opens his first jewellery shop in south London
1851年 – Samuel Smith在伦敦南部开了他的第一家珠宝店

1904 – Smiths is a pioneer in the development of speedometers and rapidly becomes the market leader
1904年 - Smiths是里程表发展方面的先驱，并迅速成为该市场的领导者

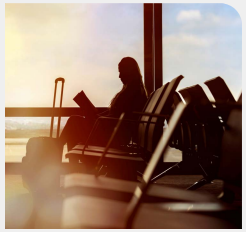
1919 – The first direct transatlantic flight from Newfoundland to Ireland uses Smiths instruments
1919年 – 第一次直接跨越大西洋、从纽芬兰到爱尔兰的航班使用的是Smiths仪器

1965 – A BAC Trident makes the first fully automatic landing in civil aviation using Smiths instruments
1965年 – 一架BAC三叉戟使用Smiths仪器实现第一次民用航空上的全自动着陆

1958 – A Smiths engineer and local obstetrician collaborate to adapt ultrasonic technology used for fault-finding in shipyards into a functioning, safe medical ultrasound device
1958年 – 一位Smiths的工程师和当地妇产科医生合作，把在船厂中用于故障探测的超声波技术改造成一种正常运作和安全的医疗超声设备

Smiths Medical's safety needles protect healthcare workers from needlestick injuries
Smiths的医疗安全针头保护医务人员不被针头刺伤

Smiths Interconnect's microwave products enable next-generation communications networks
Smiths互连微波产品使下一代通信网络变得可行



Smiths Detection's advanced X-ray systems detect threat items and contraband, helping protect air travelers around the world
史密斯探测的X光设备用于探测恐怖威胁及违禁品，以保护航空旅客的安全

John Crane's seals help extract and transport oil and gas safely at extreme pressures and temperatures
约翰克兰的密封件帮助人们在极端压力与温度环境下安全地提取和运输石油与天然气

Flex-Tek's ultra-lightweight hoses make next-generation airliners more fuel efficient
Flex-Tek的超轻软管让下一代客机更节省燃油

Our five divisions
我们的五大业务

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John Crane

Engineered components and services for the energy services sector
面向能源服务业的工程组件与服务

Smiths Medical

Innovative medical devices for hospital, home and speciality care environments
面向医院、家庭和专业护理的创新医疗设备

Smiths Detection

Sensors for detecting and identifying security threats and contraband
用于检测和识别安全威胁与违禁品的探测装置

Smiths Interconnect

Electronic components and systems which provide connectivity, communication and surge protection
提供互连、通信和浪涌保护的电子器件与系统

Flex-Tek

Engineered components to heat and move fluids and gases
加热及移动液体与气体的工程组件

Our products and services touch the lives of millions of people every day and help make the world safer, healthier and more productive.
我们的产品和服务每天触及千百万人的的生活，并致力于打造一个更安全，更健康并更卓有成效的世界。

We employ over 23,000 people in more than 50 countries through five divisions.

我们五大业务的雇员超过23,000人，分布于50多个国家。

10% of our workforce are in engineering and more than that are engineers, we need to attract, retain, develop and inspire those engineers

10%的员工从事工程技术工作，并且集团一直致力于吸引、保留、激励这些工程技术人员，并为他们提供发展机会

These engineers have to be capable and aligned with our requirements

这些工程师需要具备相应的能力并符合集团的要求

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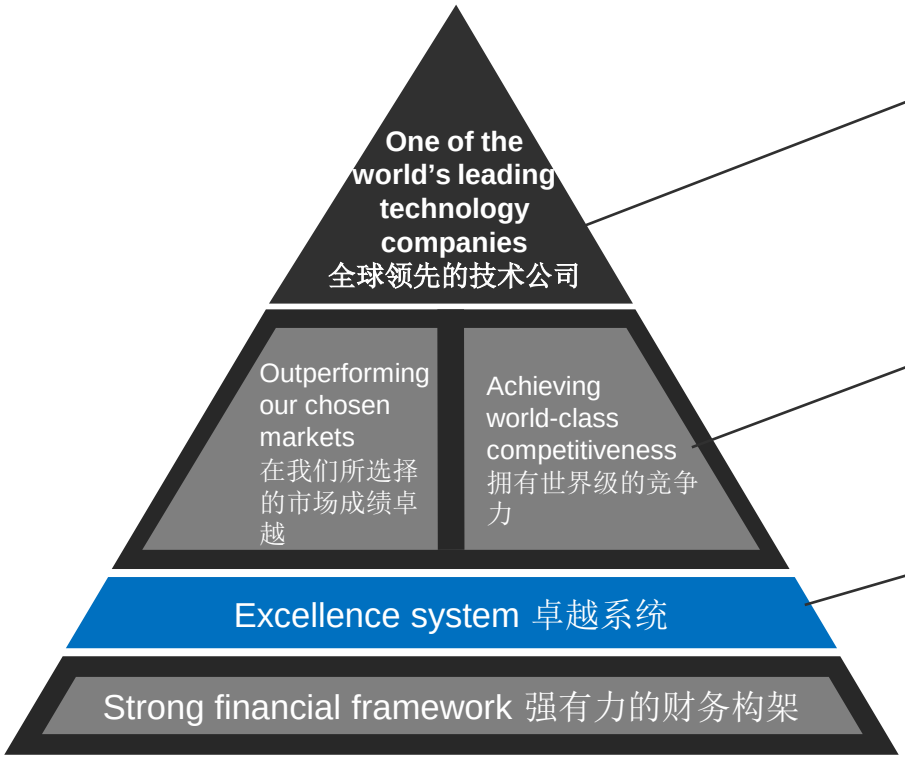
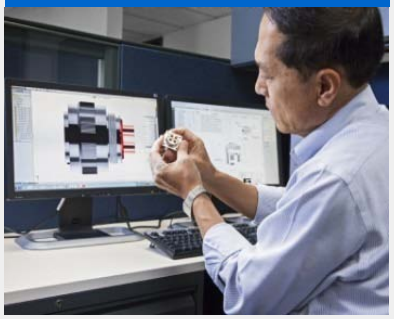


Engineering is the core of Smiths. We need engineers capable in the modern environment
工程技术人员是史密斯集团的核心。我们需要工程师的能力符合现代环境的需要。

Universities and technical schools need to produce these engineers
大学和技术学校是培养这些技术人员的圣地

This needs to be a combined effort and a continuous process
这需要大家共同的努力和建立一个可以持续过程



Market Served in China and trends
我们在中国所专注的市场和发展趋势….

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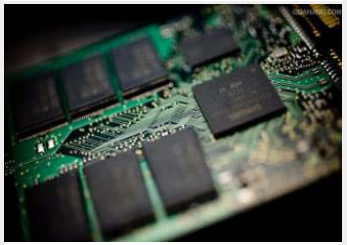
Health Care 健康医疗	Energy and Petrochemical 能源与石化	Threat and Contraband Detection 探测恐怖威胁与违禁品	Aerospace and Transportation 航空与交通	Semiconductor 半导体
				

The environment is changing and we have to respond , but also some of the fundamentals are missing:
环境在变化，我们需要应对这些变化，但同时我们需要加强一些基础

Same 不变的

- Business and Academia need to continue to recognise their mutual dependence
  业务公司和学术机构需要继续认识到相互的依存性
- We all need to recognise that engineers who are exposed to and different experiences, industries and cultures perform better
- 我们需要意识到，有不同经历，行业和文化体验的工程技术人员必将会有更出色的表现

Different 变化的

- Our future engineers are part of a generation that see work as a stream of experiences rather than a fixed point
  我们未来的工程师希望在工作获得广泛而丰富的体验，而不是专注于某一个固定的焦点上
- AI is going replace much of the general work that engineers currently do
  人工智能将替代大部分现有工程技术人员所从事的基本工作
- Digitisation will become ubiquitous
  数字化将无处不在

Create an environment that develops the engineers that understand the fundamentals
为我们的工程技术人员发展创造良好的环境

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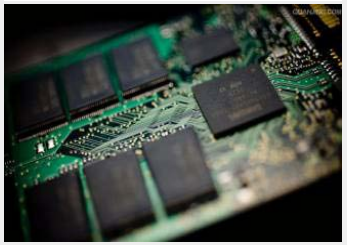
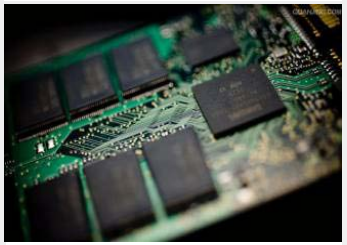
				

We need to work in the environment where engineers understand that this is life long learning and they might be employed by different organisations at different times, even by multiple bodies, they might return to academia for periods.
我们所工作的环境中的工程技术人员需要了解学习将是伴随他们终生的，并且他们可能会为不同组织在不同时间工作，他们可能在某一时间段回到学术机构继续深造。

Culture, education, work experience are going to be important: exposure to multiple cultures, education in different discipline and experience in different industries make for better engineers.
文化，教育，工作背景会非常重要：让自己浸没在不同文化、在不同教育体系中学习，并体验不同的行业可以让工程技术人员更富有竞争力

The stakeholders are the governments, standard bodies, professional organisations, academia and industry.
利益相关者包括政府、标准制定机构、专业组织、学术组织和不同行业

What we need to do
我们需要做什么

Health Care 健康医疗	Energy and Petrochemical 能源与石化	Threat and Contraband Detection 探测恐怖威胁与违禁品	Aerospace and Transportation 航空与交通	Semiconductor 半导体
				

Create an environment that develops the engineers that understand the mathematical, engineering and physics fundamentals but can drive the tools effectively:

为理解数学、工程和物理基础工程技术人员的发展创造良好的环境，并且这种环境可以通过利用有效工具来培养工程技术人员

- Design 设计
- Manufacturing 制造
- Process 流程
- Product Life cycles 产品生命周期

Not about teaching but about creating minds that can question logically and be able to make the intuitive leaps that are needed in any creative design process

不是简单的教学过程，而是建立一种可以提出逻辑问题的创造思维能力及直觉跳跃能力，这一能力是任何创新设计过程的基础

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Our response我们的责任:

- Understand and influence the global megatrends
  了解并影响全球的宏观趋势
- Listen to and guide our customers
  悉心聆听我们的客户，并为其提供建议
- Work to develop standards that improve the world
  为世界进步而提高标准
- Align with organisations that develop and influence standards
  和制定及能影响标准的机构达成共识
- Align with specific educational institutions to develop engineers fit for purpose. Developing degrees with greater periods of time in industry and broader experiences
  和相关教育机构为培养工程技术人员达成共识。培养具有更多行业，更广泛经验的人才
- Recognise that we can understand the disciplines that will be more prevalent in the future e.g. digital. However more importantly develop the model of the professionally resilient engineer
  认识到我们对将要流行的领域如数字化有深入的了解。但是更重要的是能够培
  养出更加具有弹性的工程技术人员
- The professionally resilient engineer can cope in different cultures, has a growth mind set that recognises that development is an on going issue and although subject matter expertise is important, the ability to question and analyses new situations is very valuable
  这些具有弹性的工程技术人员可以应对不同的文化，有发展的意识，这让他们意识到发展是个
  不断持续的过程。尽管专才是重要的，但是具有能够挑战和分析新形式的能力更加重要

Sponsorship of Engineers to allow movement and experience

为工程技术人员的流动和体验提供支持

Flow talent between academia and industry

让人才在学术机构和行业间流动

Flow talent between suppliers and customers

让人才在客户及供应商间流动

Recognise that expertise is fundamental but flexibility and resilience needs to be nurtured

认识到专才固然是基础，但是灵活和弹性更需要培育

Use professional bodies to support the engineer through professional life

通过专业机构对工程技术人员提供终生的职业发展

Our strengths and responses
我们的优势和责任

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- Market insight and strong customer relationships市场洞察力和强大的客户关系
  Informs new product development and supports our ability to meet customers' needs
  指引新产品开发和支撑起我们的能力，以满足客户的需求

- Work with these customers to explain the mutual responsibility to develop engineering talent, through exchange, joint programmes and collaboration
  让客户和我们形成同样认知-通过相互交换、联合项目及合作来共同培养工程技术人才是我们共同的责任

- New product development and product engineering新产品开发与产品工程
  We excel at product engineering and the practical application of state-of-the-art technology
  我们擅长产品工程和最新技术的实际应用

- Do not lose sight of the fact that we do need highly specific and highly educated functional expertise
  不要忽律我们同样需要非常专注并接受过良好训练的职能部门的专家这一事实

Our strengths and responses
我们的优势和责任

Bring technology to life
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- Globally recognised quality brands全球公认的优质品牌
  Portfolio of market-leading brands recognised by customers around the world
  全世界客户认可的市场领先品牌组合

- Utilise this and the bonds between academia globally to expose engineers to different cultures and experiences, both technical and personal
  利用我们的优势并和学术机构合作让工程技术人员能够有机会体验不同的文化及技术和个人经验

- Expertise in small batch manufacturing and aftermarket service小批量制造和售后服务专长
  International manufacturing with access to global sales & service network supports customer service 国际化制造，加上全球销售与服务网络，支撑起客户服务

- Recognise that business models are changing and that the environment demands everyone including engineers have to be more resilient and flexible in the future
  需要认识到业务模式在发生快速的变化，新的环境要求包括工程技术人员在内的每个人都更加具有弹性及灵活性

Why China is important for Smiths Group
为什么中国市场对史密斯如此重要

	1990	2016	2023	2030
China % of WW GDP	~2%	~14.8%		~27%
GDP relative to the US	10%	61%	100%	150%
GDP relative to the EU5	10%	94%		240%
# of Chinese Fortune 500 companies	0	~110		~150

China has been a huge force in the world economy for a number of years and drives 25% of the world's total economic growth. If trends continue, its Gross Domestic Product (GDP) will equal that of the United States by 2023 and will be one and a half times larger by 2030.
许多年来，中国已经是世界经济中不可小觑的一股力量，它对全球经济增长的贡献率高达25%。如果继续保持这种增长趋势，到 2023 年，其国内生产总值 (GDP) 将与美国相当，到 2030 年将是美国的 1.5 倍。

China's importance in the world economy continues to grow, it is all of our responsibility to develop the engineering community to make it the best in the world
中国在全球经济中的重要性与日俱升，我们每个人都有责任为中国的工程技术群体成为世界一流而付出努力