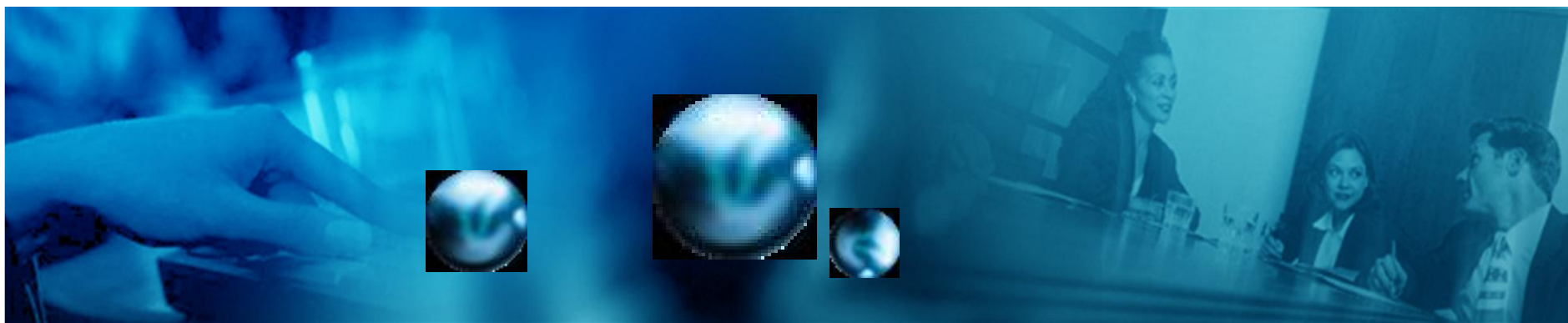


# 食品加工及包装机械自动化是 未来大势所趋



英国加工与包装机械协会联盟  
中国区总经理，首席代表

陈昌邑



## PPMA协会联盟简介

- ❖ 1987年成立
- ❖ 2008年兼并BARA, UKIVA, PMMDA
- ❖ 目前在英国有400多家会员公司。

会员公司生产的设备涵盖领域:食品, 饮料, 制药, 化妆品, 化工, 塑料, 金属, 烟草等
- ❖ 与英国政府及欧盟职能部门保持良好沟通与合作
- ❖ 1999年成立中国办事处
- ❖ 与中国各地政府及行业协会保持合作关系
- ❖ 中国地区有员工17人, 顾问专家6人

## 演讲内容

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英国食品行业自动化现状与发展

自动化是发展的必然趋势

如何进行自动化升级

## 英国技术趋势

1. 机器人技术应用的增长
2. 更多使用伺服系统（随着价格的降低）
3. 增加“直接进卖场”包装
4. 更多使用标准件
5. 直立袋
6. 更加重视‘在线清洁’（**CIP**）
7. 无菌包装机械（有机饮料等）
8. 更快，更高效的外部检测与称量
9. 更多地电脑控制
10. 为高速与耐磨而创造的新材料
11. 射频识别（**RFI**）
12. 用纸盒而不是瓶子包装液体
13. 反复开启包装
14. 增加印刷速度与精确度（比如条码和安全码扫描等）

## 英国制造业面临的挑战

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- ❖ 不断来自海外的竞争
- ❖ 能源成本增加
- ❖ 材料成本增加
- ❖ 熟练工人缺乏
- ❖ 经济衰退

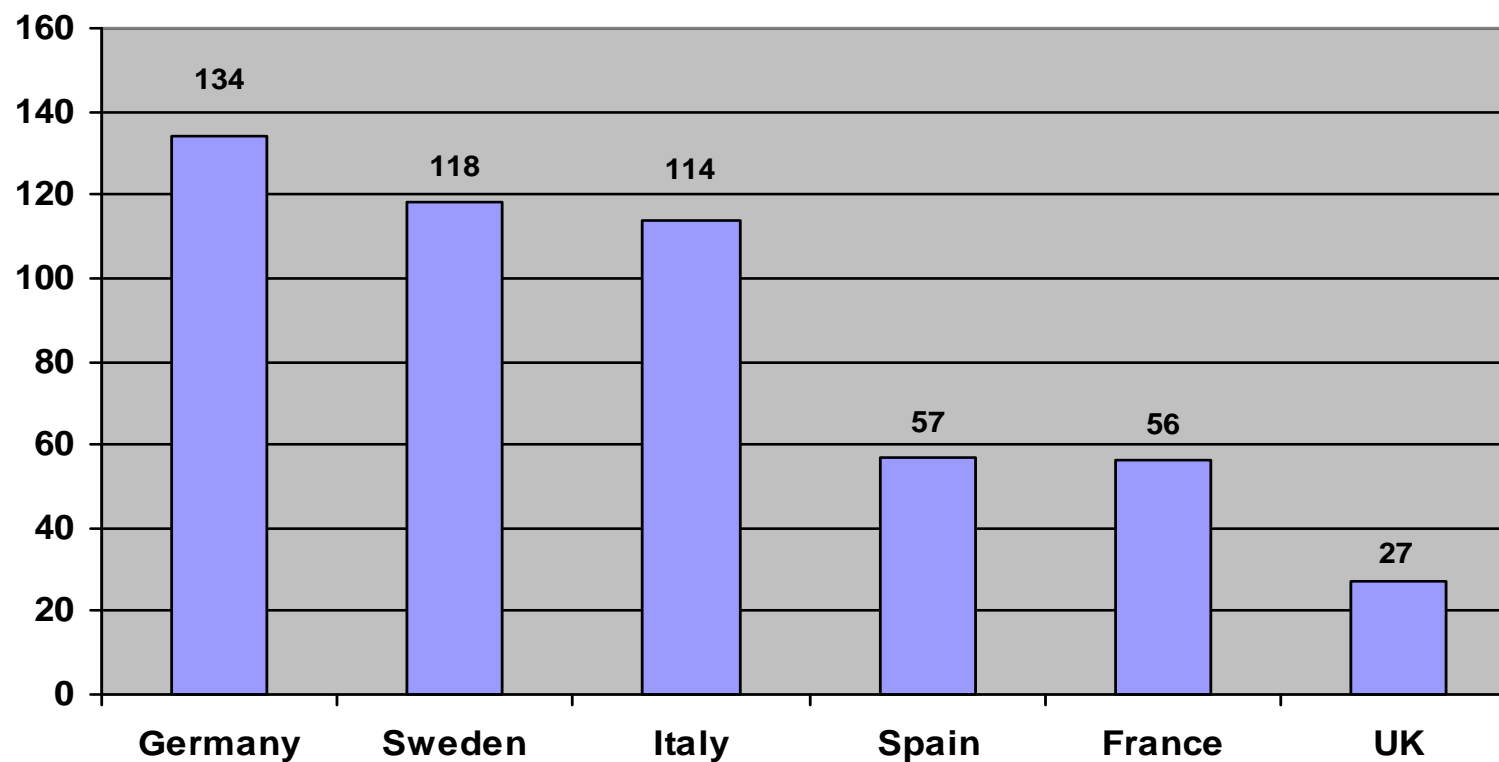
## 可能选择的方案

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- ❖ 维持现状
- ❖ 走出去或被兼并
- ❖ 关门
- ❖ 提高竞争力

## 欧洲几大工业国自动化投资状况

非汽车行业机器人统计  
(机器人数量/万劳动力)



世界机器人组织 - 2011

# 成功的关键因素

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- ❖ **There have been installations which do not meet expectations, often because:**
  - ❖ **Poor specification**
    - Lack of understanding by supplier of customer needs
    - Items missing from specification
    - Over specified – unnecessary features
  - ❖ **Poor selection of suppliers**
    - Price cutting
    - Often on price alone
  - ❖ **Poor training**
    - Little involvement in project
    - Lack of skills to optimise, use & maintain
  - ❖ **Lack of impartial advice**
    - Poor understanding of capabilities and constraints



# Impartial Expert Support

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## ❖ **Manufacturing Review**

- To identify opportunities for Automation
- Report
- 100% funded

## ❖ **Implementation Support**

- Develop opportunities from Review
- Concept, budget, specification, identification of suppliers
- Max. 20 days support – 50% funded
- Cost £400 per day

## ❖ **Eligibility**

- Potential, justifiable requirement
- Support can add value
- Willing to invest in automation

# 意识

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## ❖ Road Shows

- Automation user sites
- Experiences of the automation user
- Tour of facility
- Lander Automotive, Harwin, Nat. Food Manufacturing Centre
- New events to be announced shortly

## ❖ Seminars

- Educational seminars at automation suppliers
- British Plastics Federation (27th Oct)
- Food and Drink Federation (10th Nov)

## ❖ Web: [www.automatingmanufacturing.co.uk](http://www.automatingmanufacturing.co.uk)

## 结论

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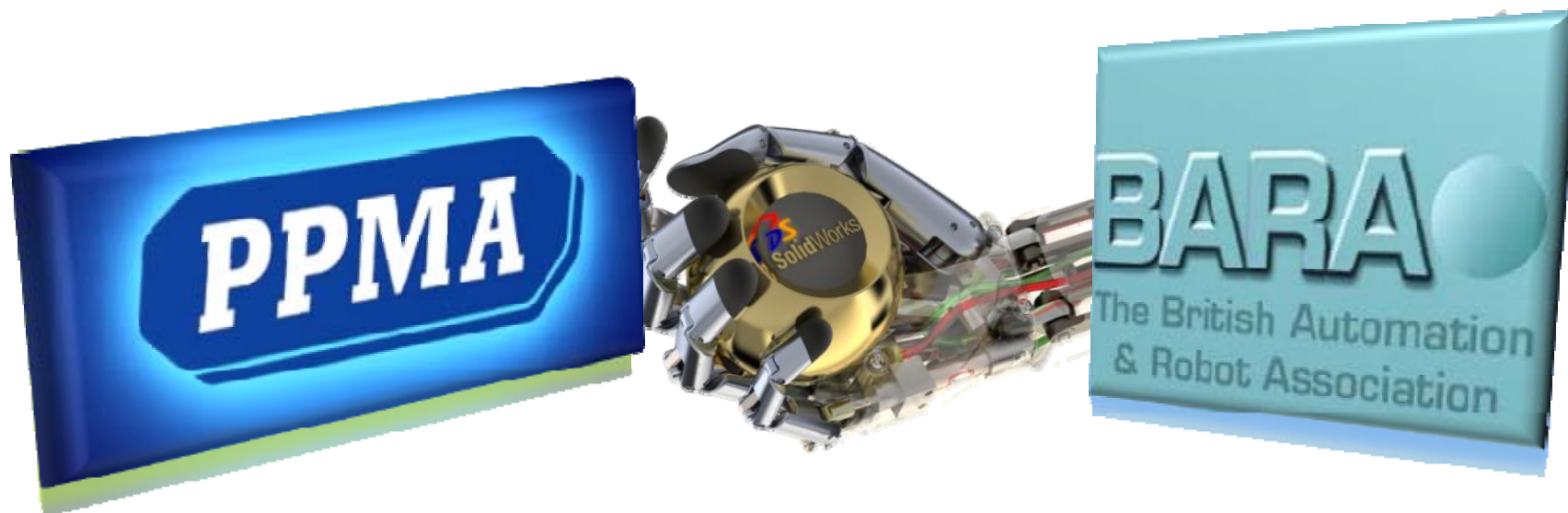
- ❖ UK Manufacturing must be competitive
- ❖ 3 Pillars for success
  - Product & process innovation
  - Effective organisation (lean manufacturing)
  - Capital investment (equipment)
- ❖ Success requires investment in equipment
- ❖ Flexible automation is key element
- ❖ Support is available

**PPMA**

**BARA**

**PMMDA**

**UKIVA**



**A new relationship**

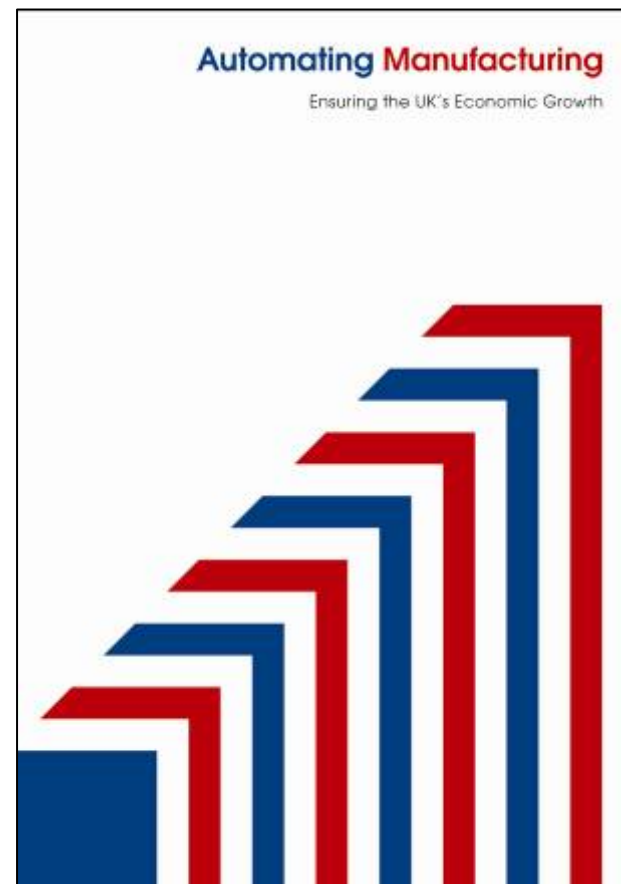
*The Process & Packaging Machinery Association*

# 2011年英国政府支持 PPMA/BARA推出 AMP计划

## UKTI 推出AMP计划



- ❖ 政府拨款 - £600k
- ❖ 到 2013年3月底完成
  - 提高意识
  - 支持出口





**Mike Wilson**

**Web:** [www.automatingmanufacturing.co.uk](http://www.automatingmanufacturing.co.uk)

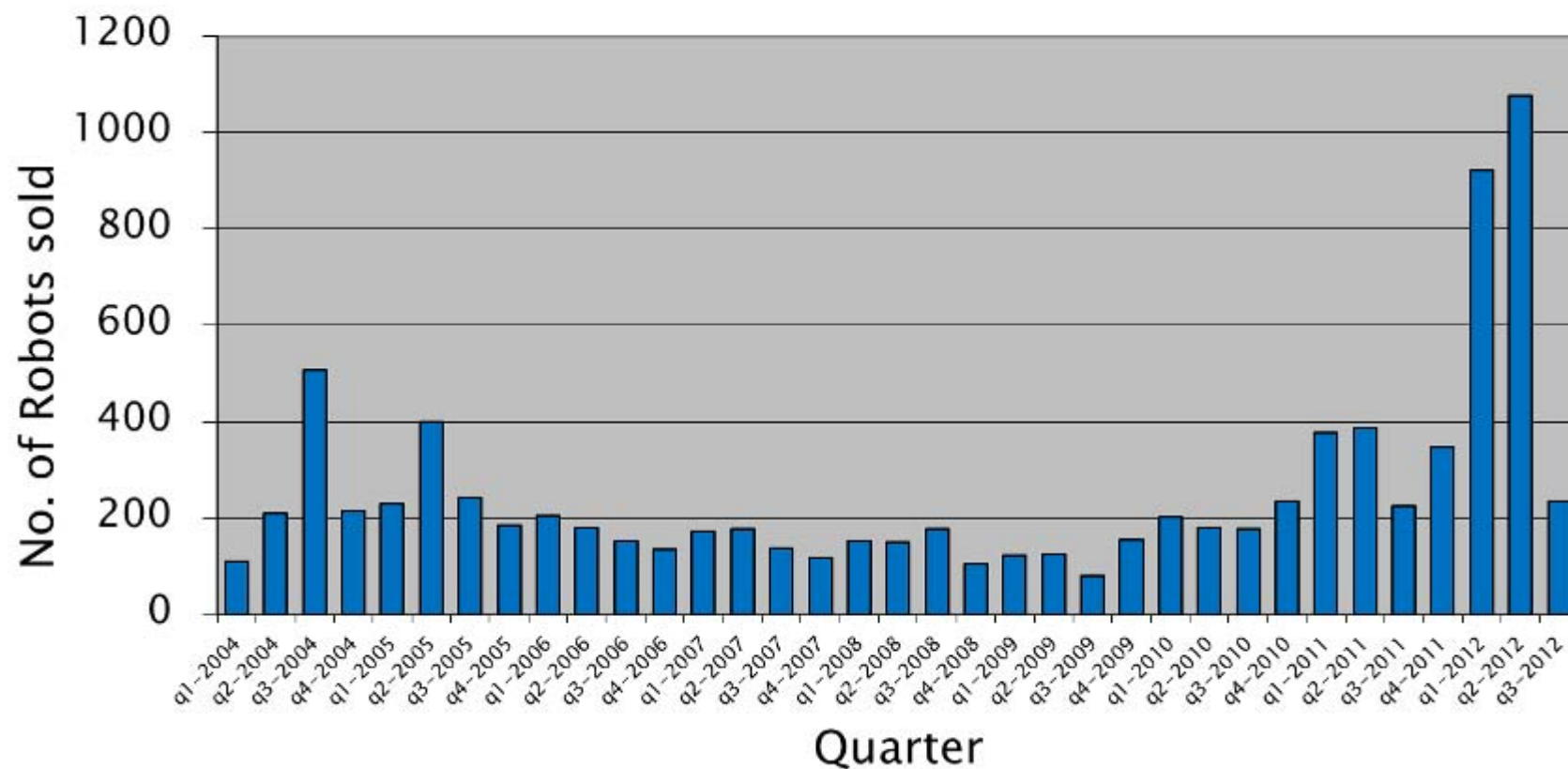
## BARA 理事长 MIKE WILSON

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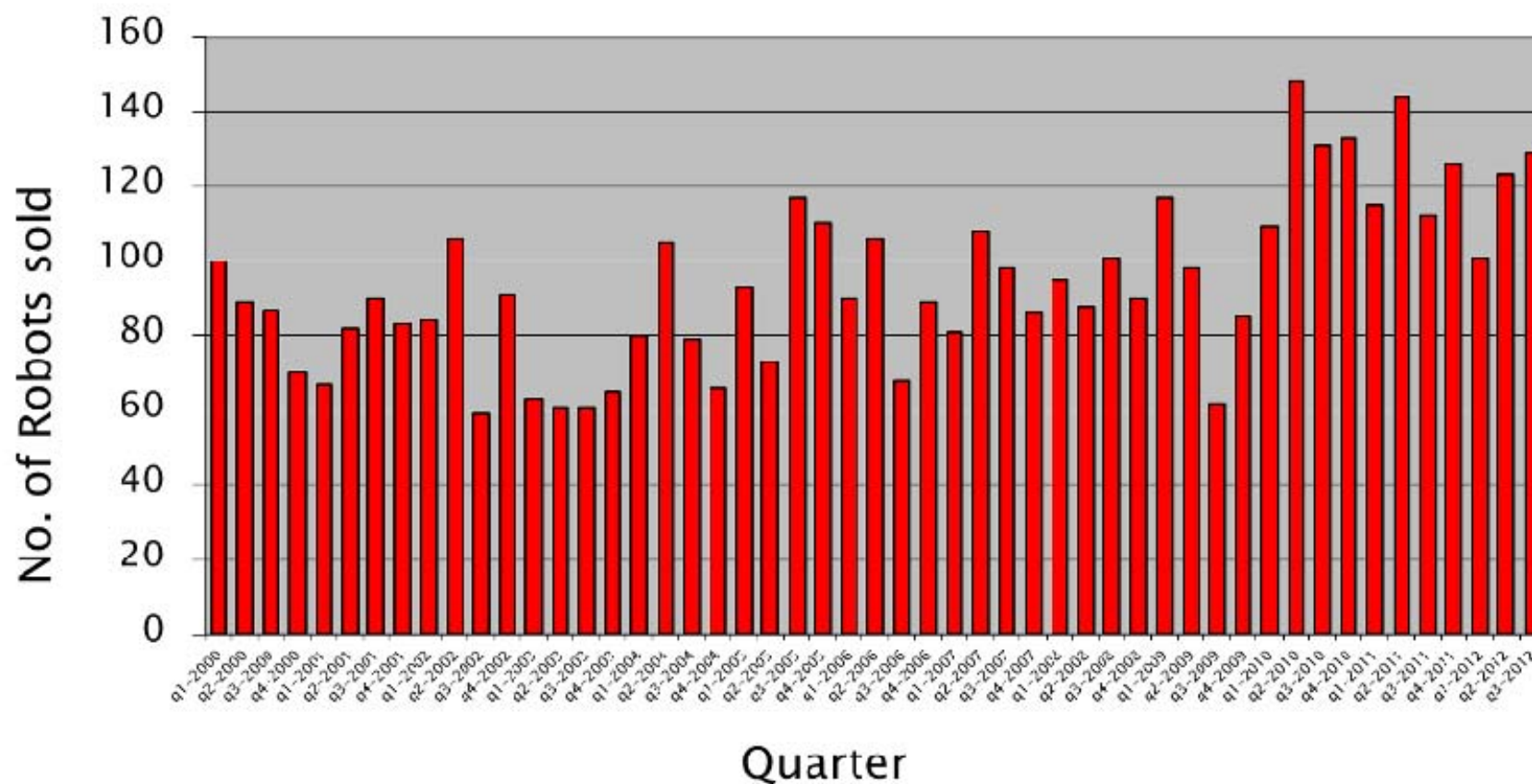




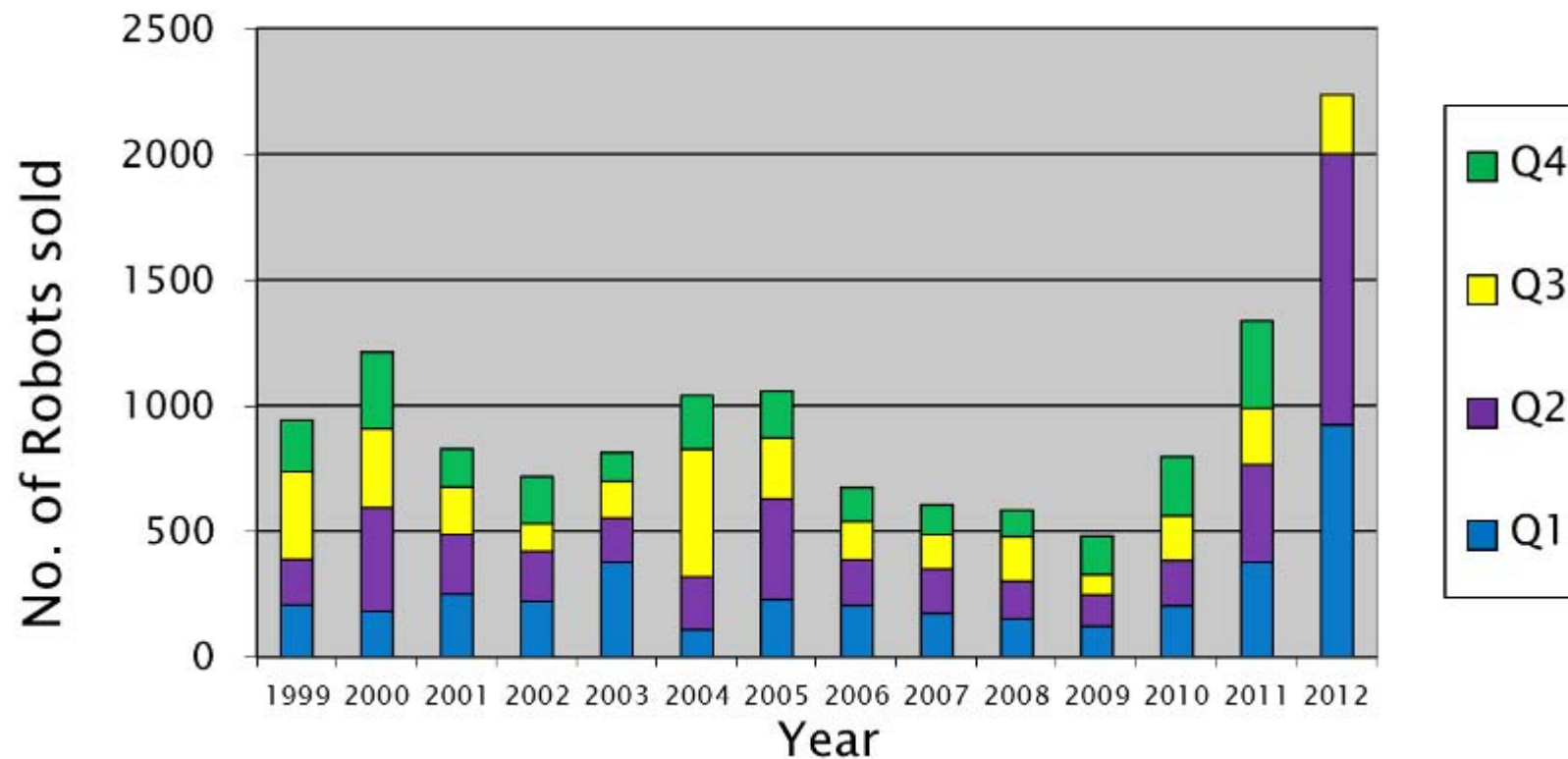
## 全英机器人销售情况(Q1 2010 - Q3 2012)



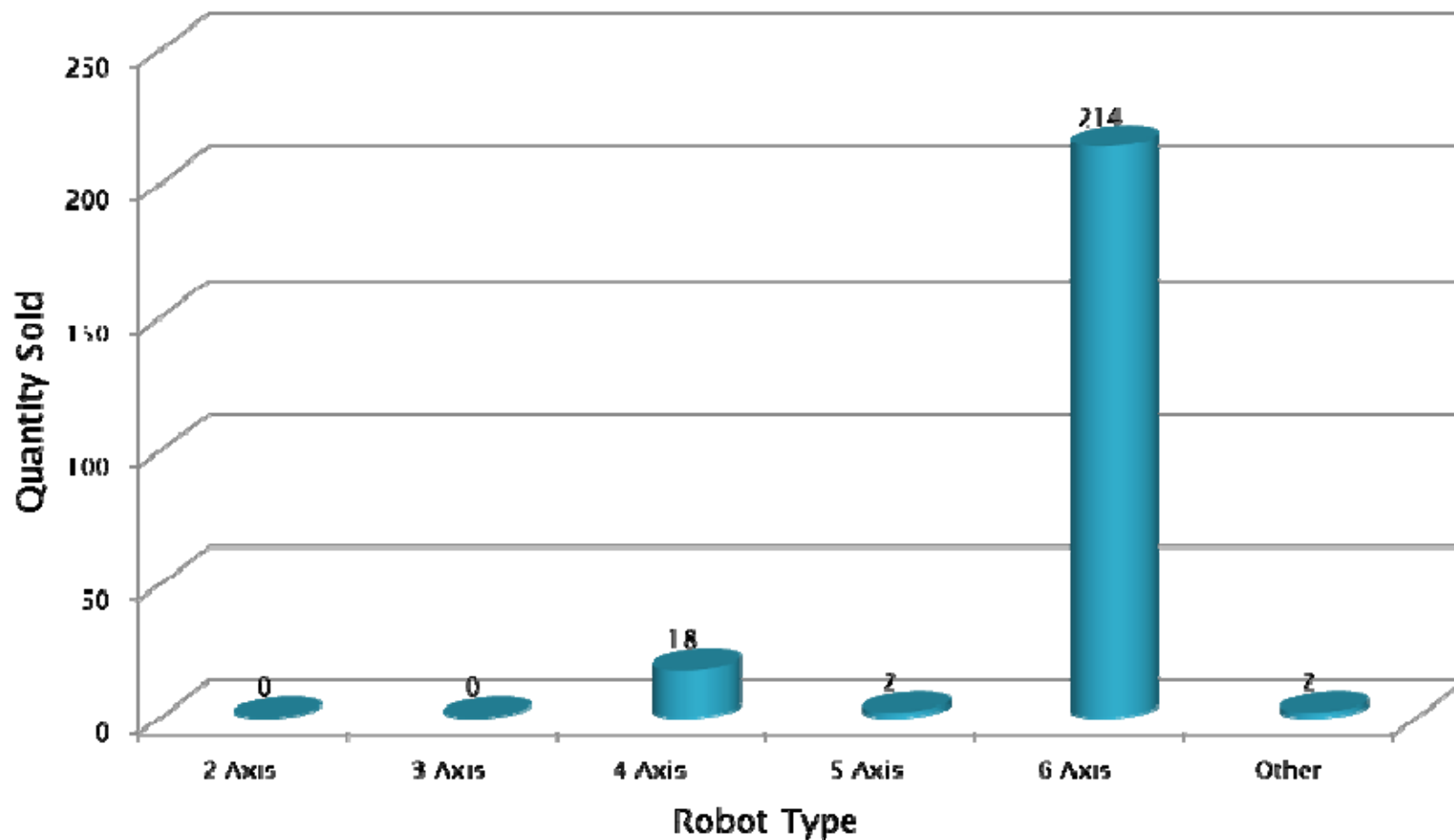
## 英国机器人销售 – 非汽车行业



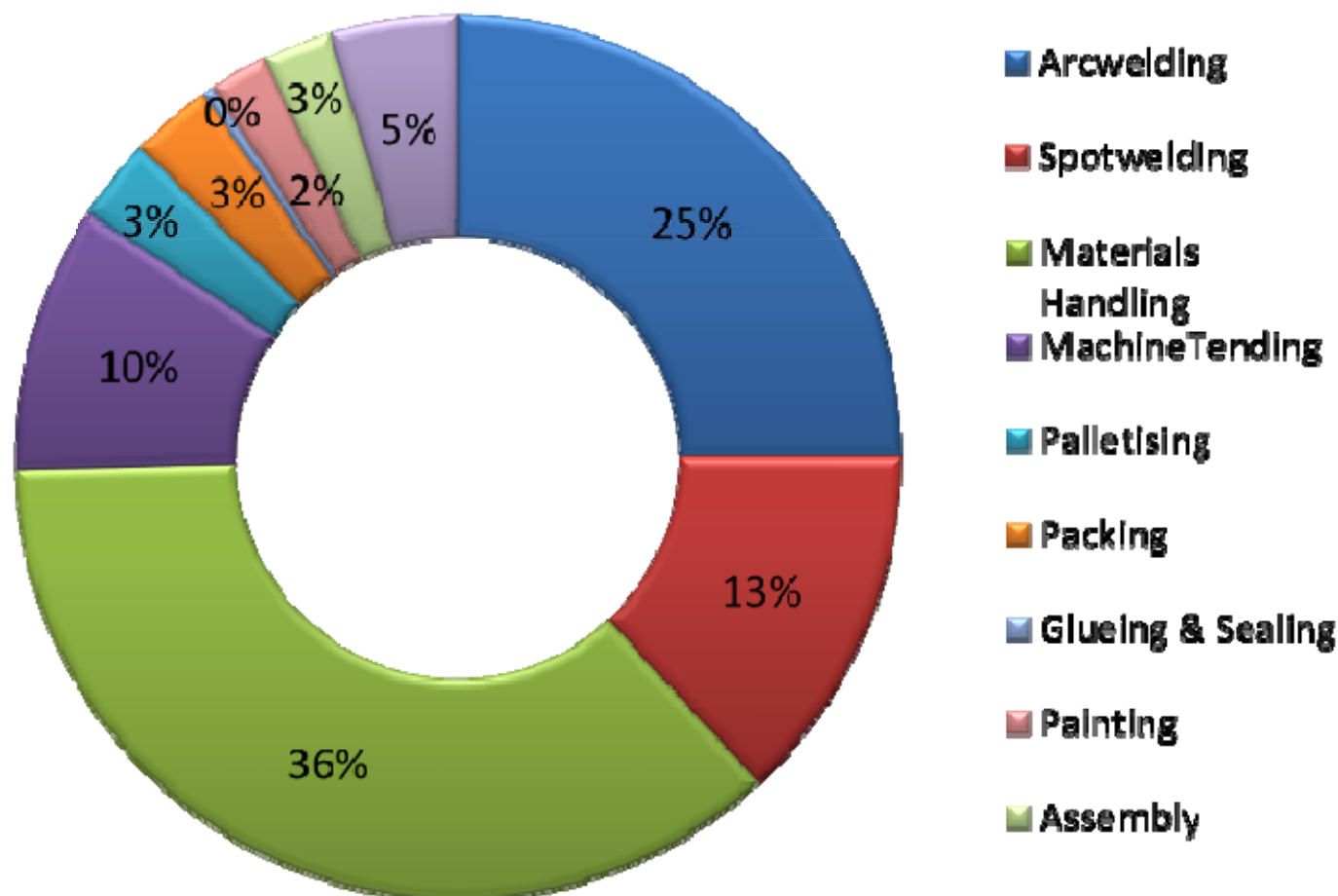
## 英国机器人销售 (1999-2012)



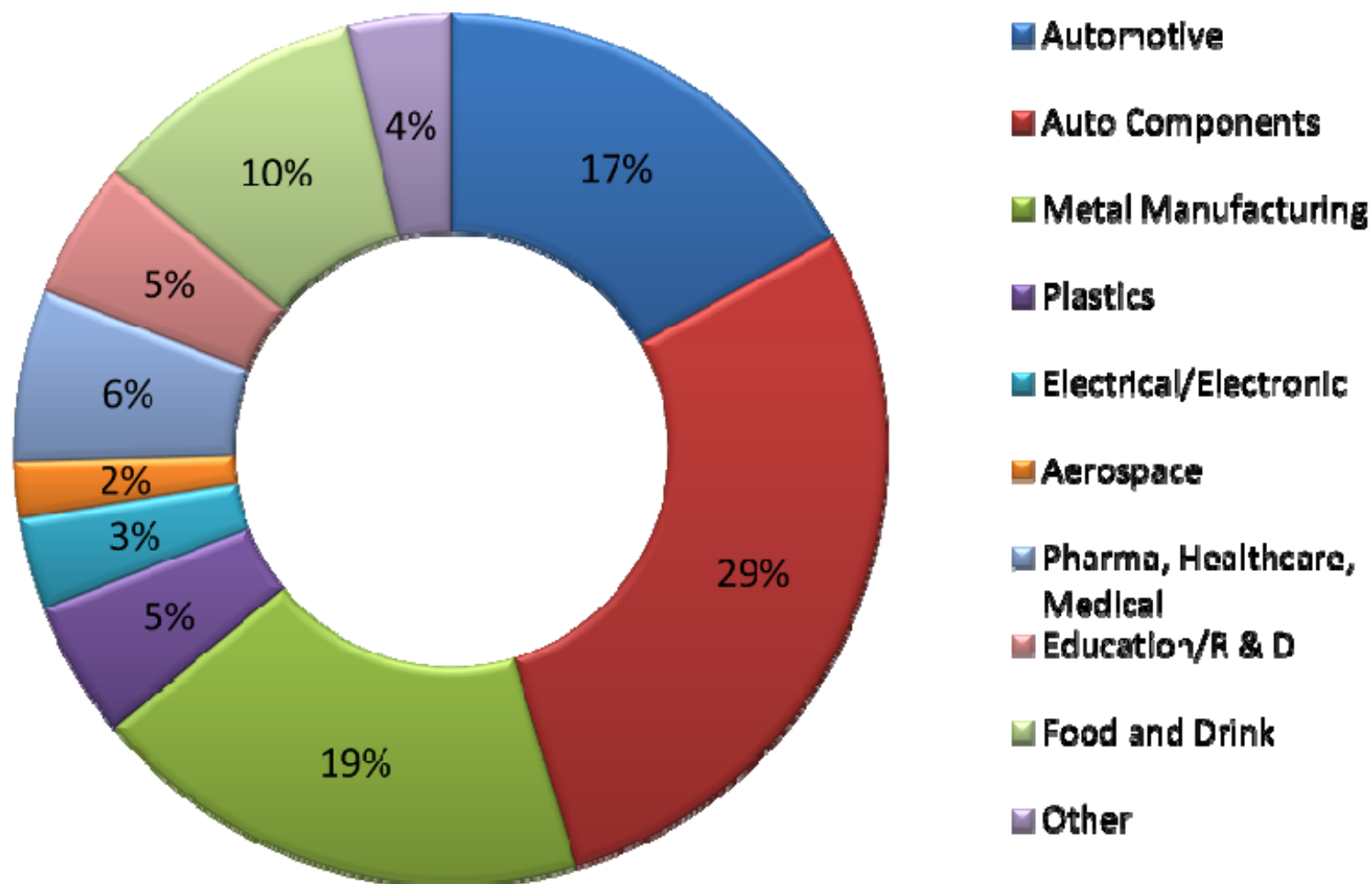
## Q3 2012 英国机器人销售情况（按型号）



## Q3 2012 英国机器人销售（按应用）



## Q3 2012 英国机器人销售情况（按工业领域）



# 机器人数据 2012

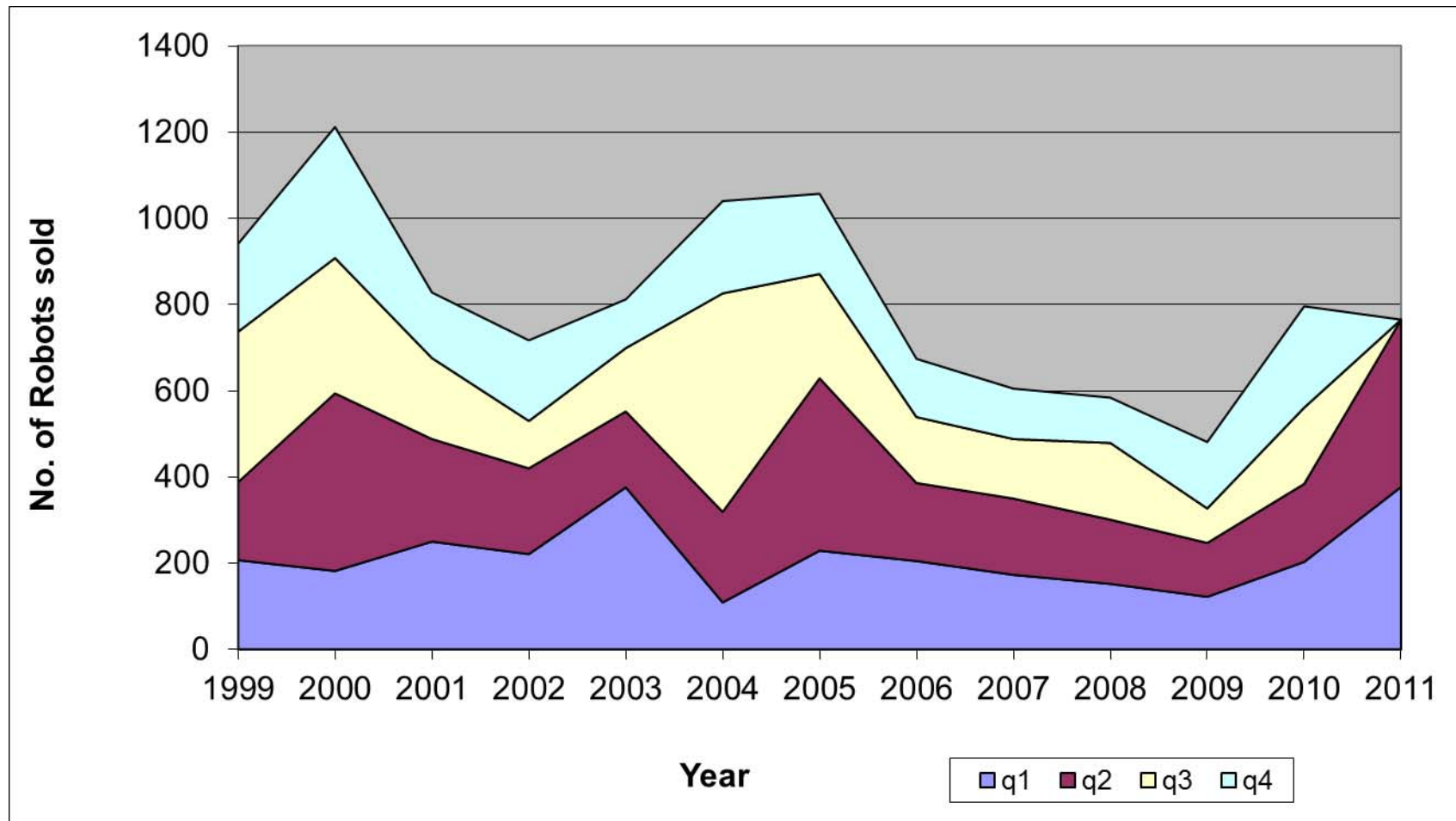
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# **Statistics for New Robot Installations in 2011**

## **Total = 1250**

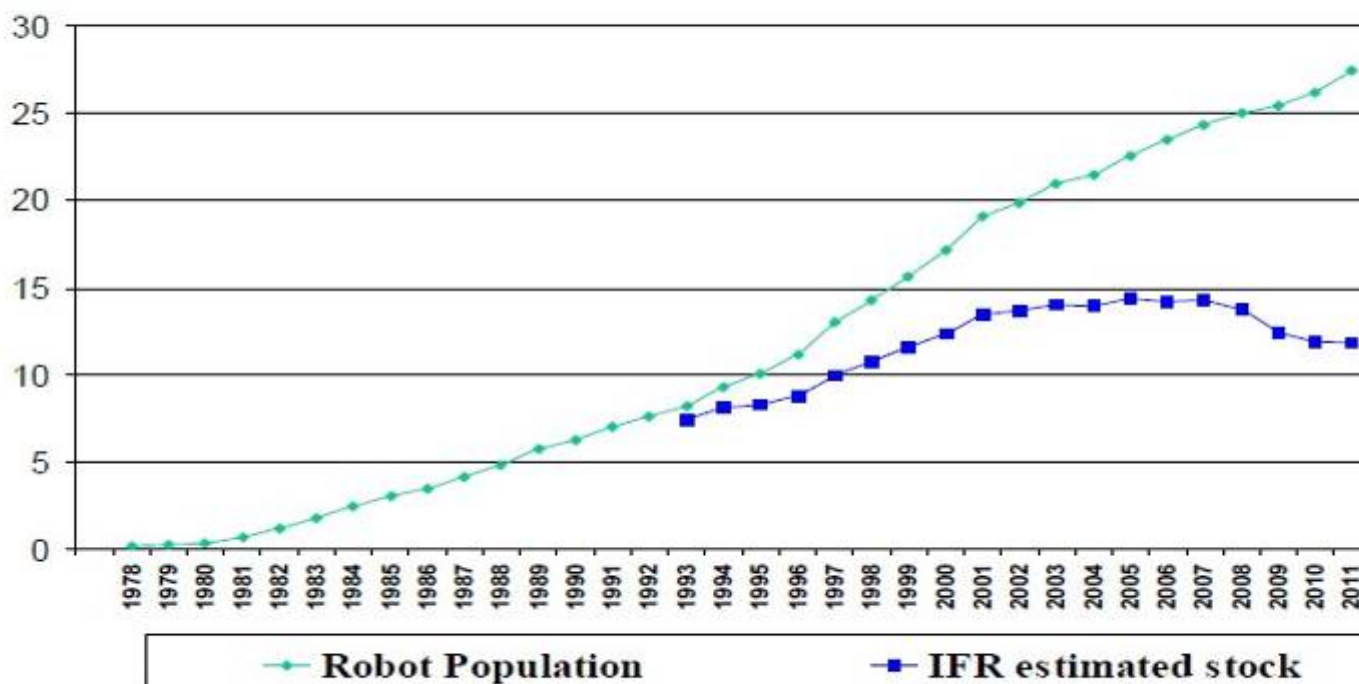


# Increasing Interest in UK





## UK Robot Population Growth (Thousands)



















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# **Statistics for Refurbished Robot Installations in 2011**

## **Total = 185**





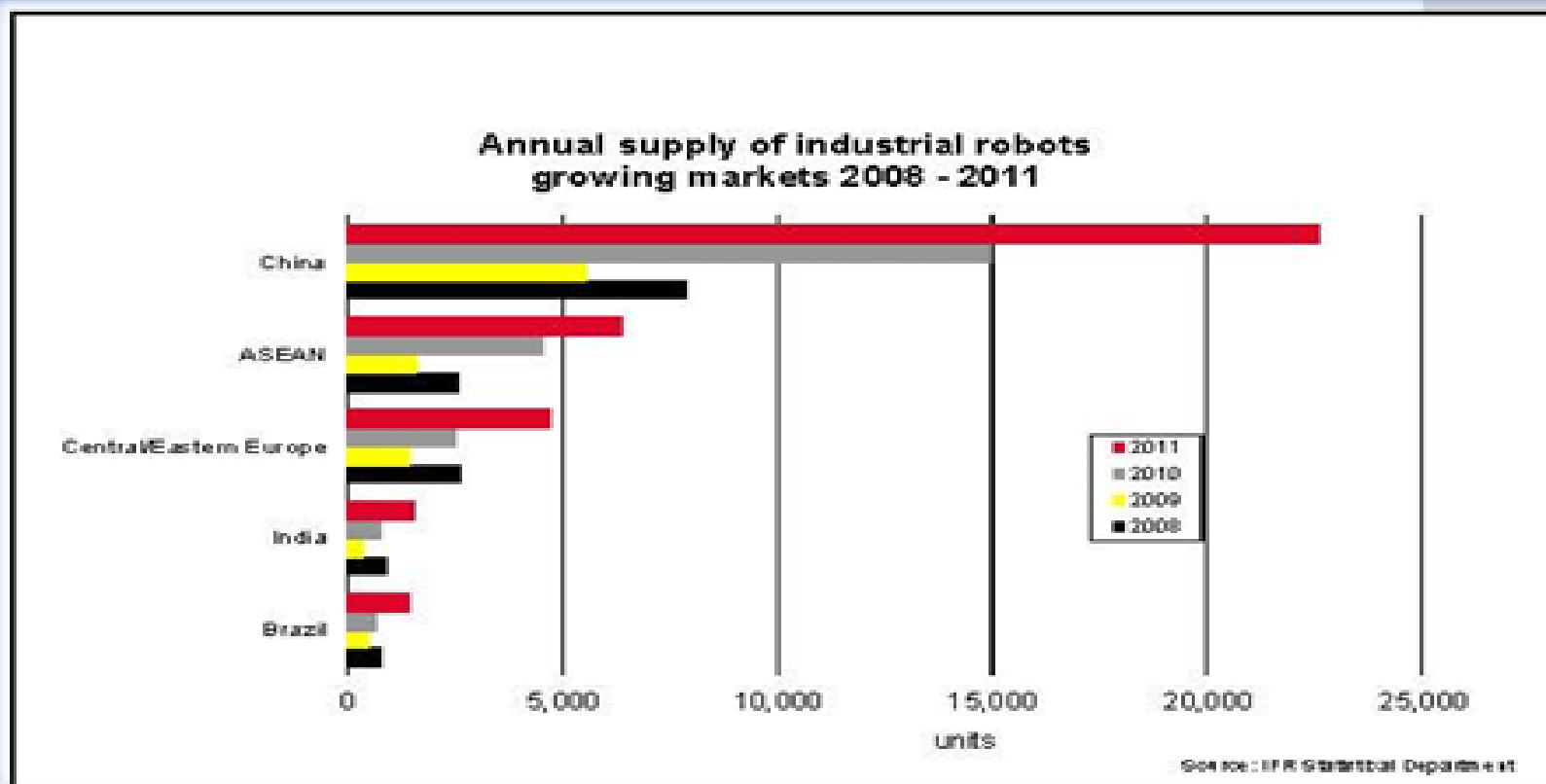




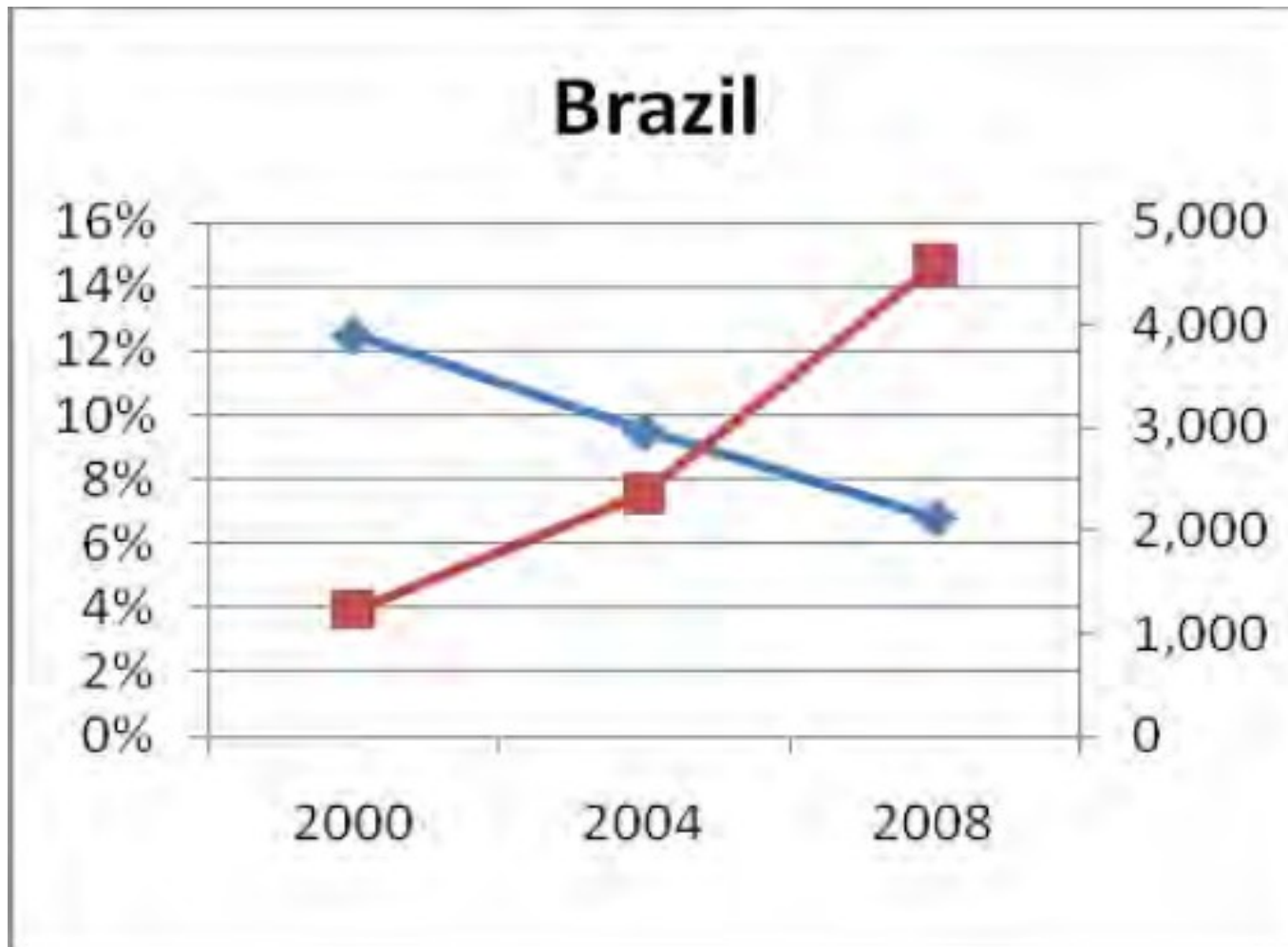


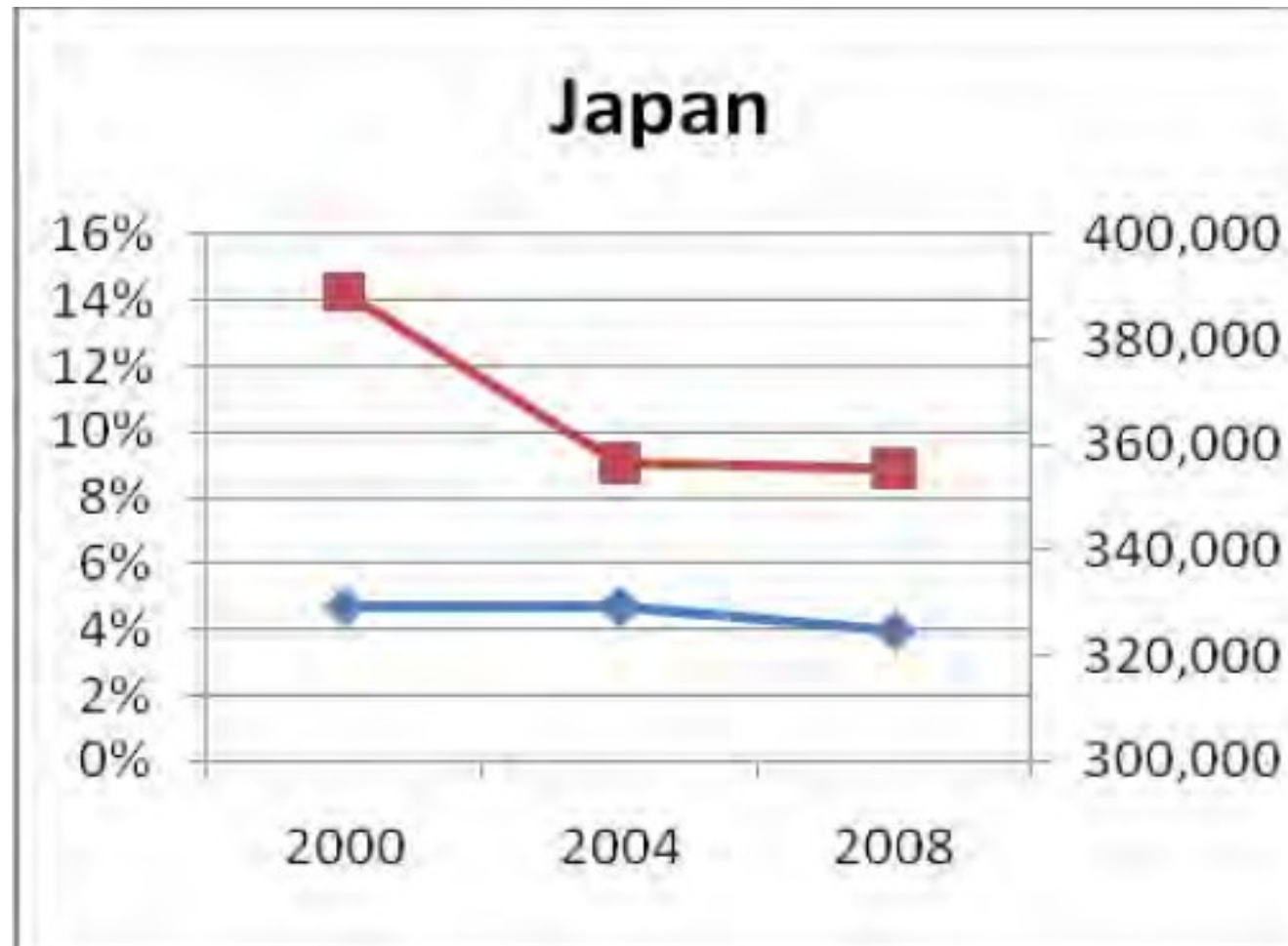


## 国际机器人应用增长趋势 (IFR)



# 失业率 VS 机器人数量关系

















## 未来怎样？

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- \* UK Government has recognised greater automation in the non- automotive industries as a prime area of focus.  
(Centre For Robotics & Automation - CenFRA)
- \* The number of new sectors adopting automation is growing fast
- \* With these new sectors there is a new robotic technology that can adapt to the environment i.e. lower cost vision and force sensor technology & dynamic object recognition in ever lower lighting levels
- \* Growing number of 'Soft' robots able to operate to higher H&S standards in areas where operators may be present
- \* Growth in the number of Robots that facilitate 'Cleaning in Place' for hygiene-sensitive sectors such as food and pharma.

## 案例分析

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- ❖ **UK has good examples of automation success stories**
  - Strong management with long term strategy
  - Not only automotive industry
- ❖ **Well executed projects**
- ❖ **Providing excellent performance**
- ❖ **Users gaining competitive advantage**
- ❖ **Achieving good financial returns**
- ❖ **Improving future business prospects and leading to growth**

# Characteristix, Cornwall

- ❖ Injection moulding of badges, pendants, fridge magnets
- ❖ Automated production and reclaim of waste
- ❖ 33,000 pieces produced per day
- ❖ Performance up more than 100%
- ❖ Motivated employees – no longer tied to machines



# Fosters Bakery, Barnsley

- ❖ Niche bread products for catering industry
- ❖ Robot unload & reload of reel oven
- ❖ 6,000 rolls per hour
- ❖ Increased oven capacity by 80%
- ❖ Saved cost of new oven
- ❖ Reduced energy costs by 50%



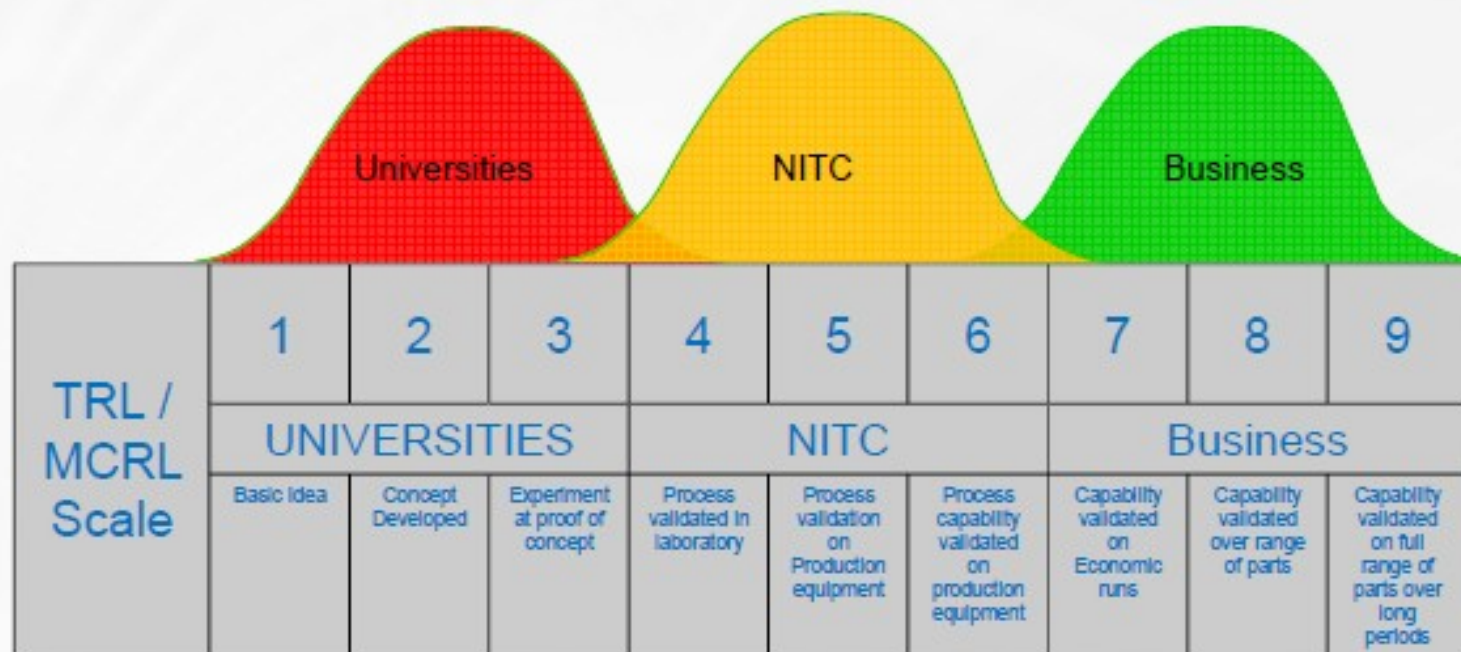
## Ilchester Cheese, Somerset

- ❖ Producer of speciality cheeses
- ❖ 2008年Tine集团入股后进行自动化升级
- ❖ Packing of cheese blocks
- ❖ Inspection of cheeses to select only correctly sized blocks
- ❖ Now 2 operators to monitor production replacing 4 packers (per shift)
- ❖ Reduced labour turnover
- ❖ Reduced wastage and increased yield (saving 1%)
- ❖ "Significant improvements in our productivity"
- ❖ Investment recouped in 2 years



# 英国自动化 教育-就业-应用情况

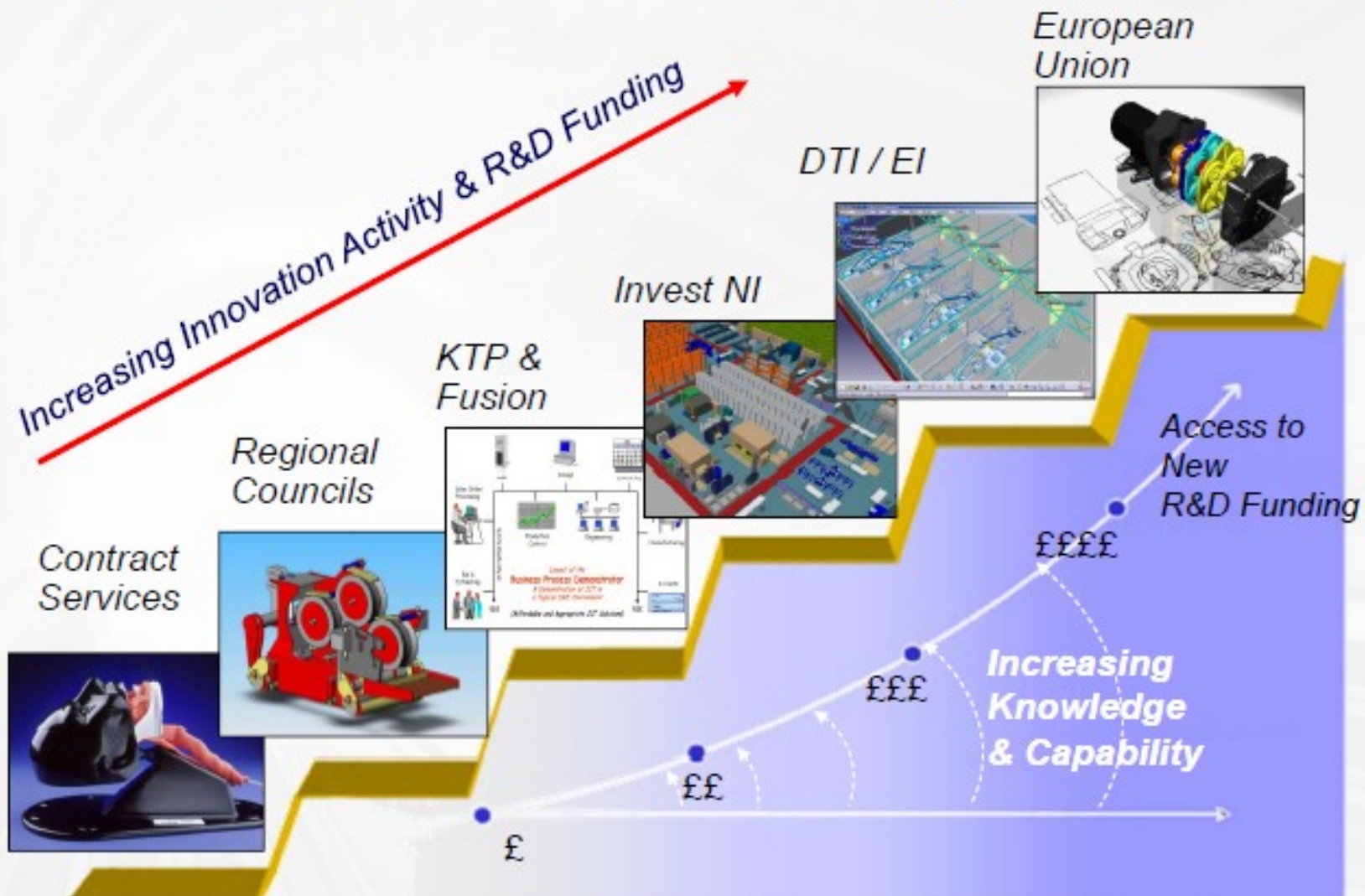




Northern Ireland  
**Technology  
 Centre**  
 Insight Applied



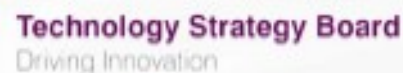
# Company Benefits of University Collaboration



- **Government Programs**  
(Local, Regional & National)



- **Innovation Programs**



- **Applied R&D**



- **Direct Consultancy**



bringing  
EDUCATION &  
INDUSTRY  
together



Northern Ireland  
Training Awards  
2004



National Training Awards  
Northern Ireland 2006

## About NRC

- **6 Campuses**
  - Ballymena
  - Newtownabbey
  - Magherafelt
  - Coleraine
- **£35 million turnover**
- **1000 staff**
- **20,000 enrolments**
  - 4000 Full Time FE&HE
  - 15000 Part Time
  - 1000 Training
- **Centre of Excellence**

Centre of Excellence  
for Manufacturing  
Engineering



A Centre of Excellence for Manufacturing Engineering

Aspire | Aim | Achieve

**nrc**  
northern regional college



bringing  
EDUCATION &  
INDUSTRY  
together



Northern Ireland  
Training Awards  
2004



Northern Training Awards  
Northern Ireland 2009

## engineering@nrc

### Staff Compliment:

- 50 Full Time Lecturing
- 30 Part Time Lecturing
- 18 Support/Technician

### Geographic Sites:

- Ballymena
- Newtownabbey
- Coleraine
- Magherafelt

### Student Enrolments:

- 400 Full-Time (HE/FE)
- 300 Training
- 800 Part-Time
- 10000 Industrial Hours



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Aspire | Aim | Achieve

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# engineering@nrc

- Vocational Training (Apprenticeships etc)
- Further Education
- Higher Education
- Essential Skills (Literacy, Numeracy & ICT)
- Entitlement Framework Programmes
- Bespoke Training Courses
- R&D Projects with Industry
- Knowledge Transfer Into Industry



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Aspire | Aim | Achieve

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bringing  
EDUCATION &  
INDUSTRY  
together



Northern Ireland  
Training Awards  
2004



National Training Awards  
Northern Ireland 2009

**U TV**

**BUSINESS EYE  
AWARDS 2011**

In association with

**easyJet.com**

***Winner of the UTV  
Business Eye  
Business/Education  
Award  
October 2011***

**RYOBI**



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Aspire | Aim | Achieve

**nrc**  
northern regional college

***The Process & Packaging Machinery Association***



**PPMA**

**BARA**

**PMMDA**

**UKIVA**

bringing  
EDUCATION &  
INDUSTRY  
together



Northern Ireland  
Training Awards  
2004



National Training Awards  
Northern Ireland 2009



**National Training Awards  
Northern Ireland Winner 2010**



**RYOBI**

**Company improvements made bit by bit**

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northern regional college

*The Process & Packaging Machinery Association*

## Apprenticeship Programme Awards

Department for Employment & Learning (DEL) Apprentice Partnership Award 2011 (Michelin the NRC)



*"This partnership between NRC and Michelin is an outstanding example of what can be achieved when employers and colleges work together to provide meaningful training whilst addressing skills needs" David Adams (Michelin Engineering Training Manager)*

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# UKSkills Competition Successes

2011 Gold Medal – Mechatronics – Neil Craig & James Overend  
(Higher National Diploma)



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northern regional college

# World Skills Competition Successes

## NRC Mechatronics Team win Medals of Excellence at WorldSkills London 2011



NRC Mechatronics Team represented Team UK at the WorldSkills International Skills Competition and won Medals of Excellence. They came 13<sup>th</sup> out of 32 countries. Chris Downey, who is employed by Michelin and Mark Maginty, who is employed by Russell Electrical Contractors will compete in the Mechatronics category.

Team were coached by NRC Senior Lecturer David Russell who was chosen as the Mechatronics Team Manager for WorldSkills.

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## World Skills Competition Successes

**NRC CNC Milling came 11<sup>th</sup> out of 19 at WorldSkills London 2011**



David is employed by Schlumberger.

Employment and Learning Minister, Dr Stephen Farry said:  
*"Northern Ireland's strong representation on Team UK is testament to the high standards of technical and professional training in our colleges. This is a wonderful opportunity for these young people to demonstrate to the world that Northern Ireland has a workforce with the high levels of skills and training required to compete in the global economy and meet the economic challenges which lie ahead."*

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## Knowledge and Innovation Transfer in Engineering

€3.9 million project partnered with IT  
Sligo & Ayr College



A Centre of Excellence for Manufacturing Engineering

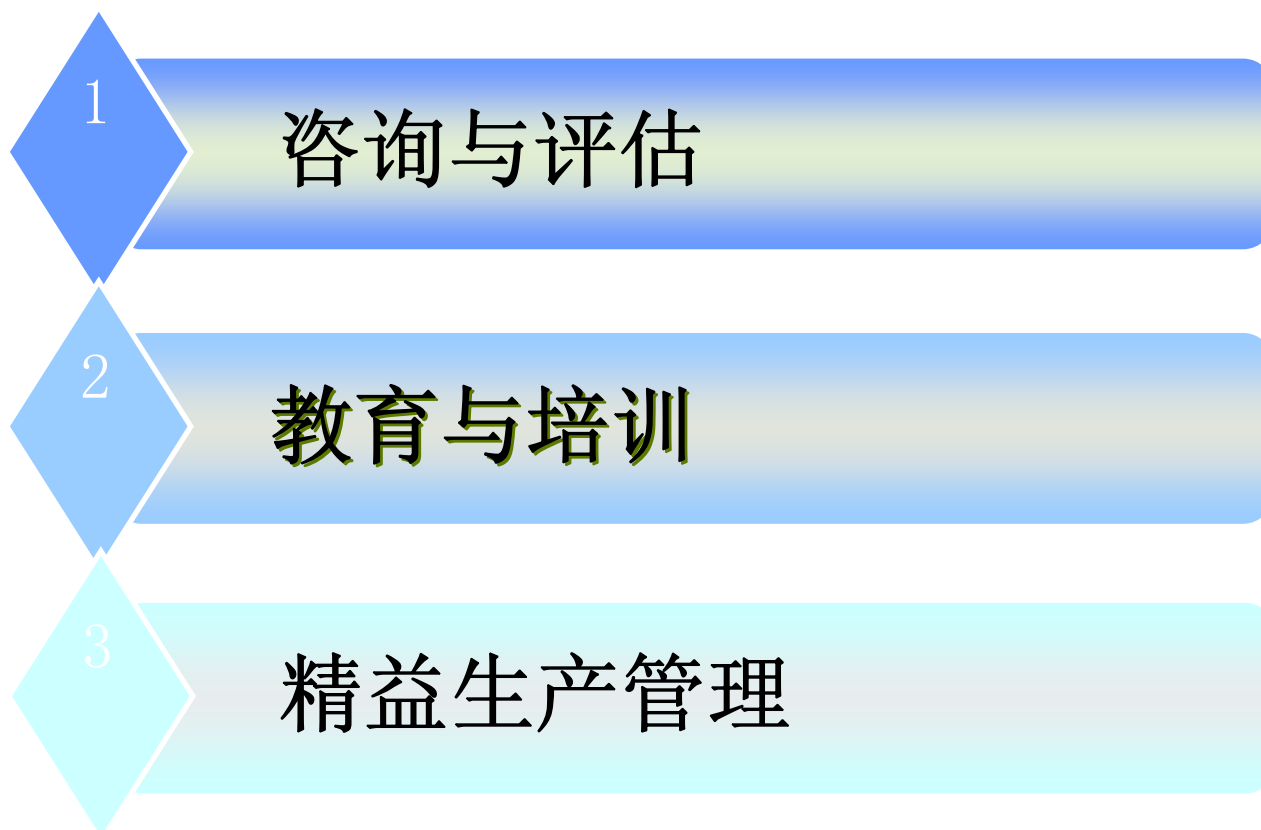
Aspire | Aim | Achieve

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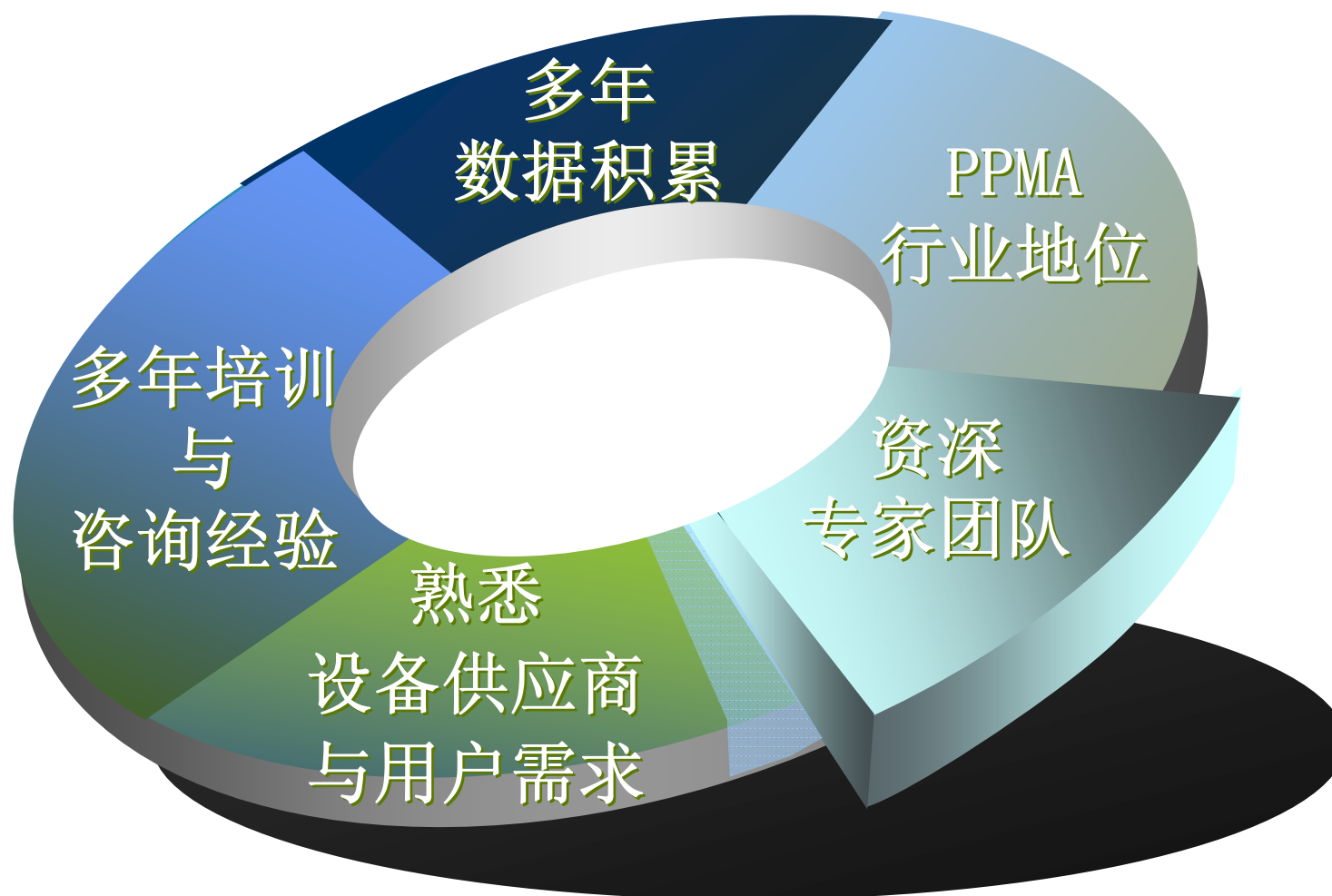
## 中国食品与制药企业面临的挑战

- ❖ 日益激烈的竞争
- ❖ 标准越来越高，执法越来越严
- ❖ 国际贸易中的技术壁垒
- ❖ 劳动力成本与使用风险增加
- ❖ 消费者安全意识提高
- ❖ 研发投入不足
- ❖ 设备更新速度较慢
- ❖ 管理相对落后

# PPMA在英国企业自动化改造与升级中发挥的作用



## PPMA的资源与优势



# 设备与生产状况评估



## 项目评估背景

### 需求

帮助企业定位，在全国甚至全球的同行里，调研他们的工艺和设备所处位置及存在差距。

### 时机

技术改造、设备更新、厂房新建之前

### 目的

改造升级以便能完成新的生产目标

## 案例

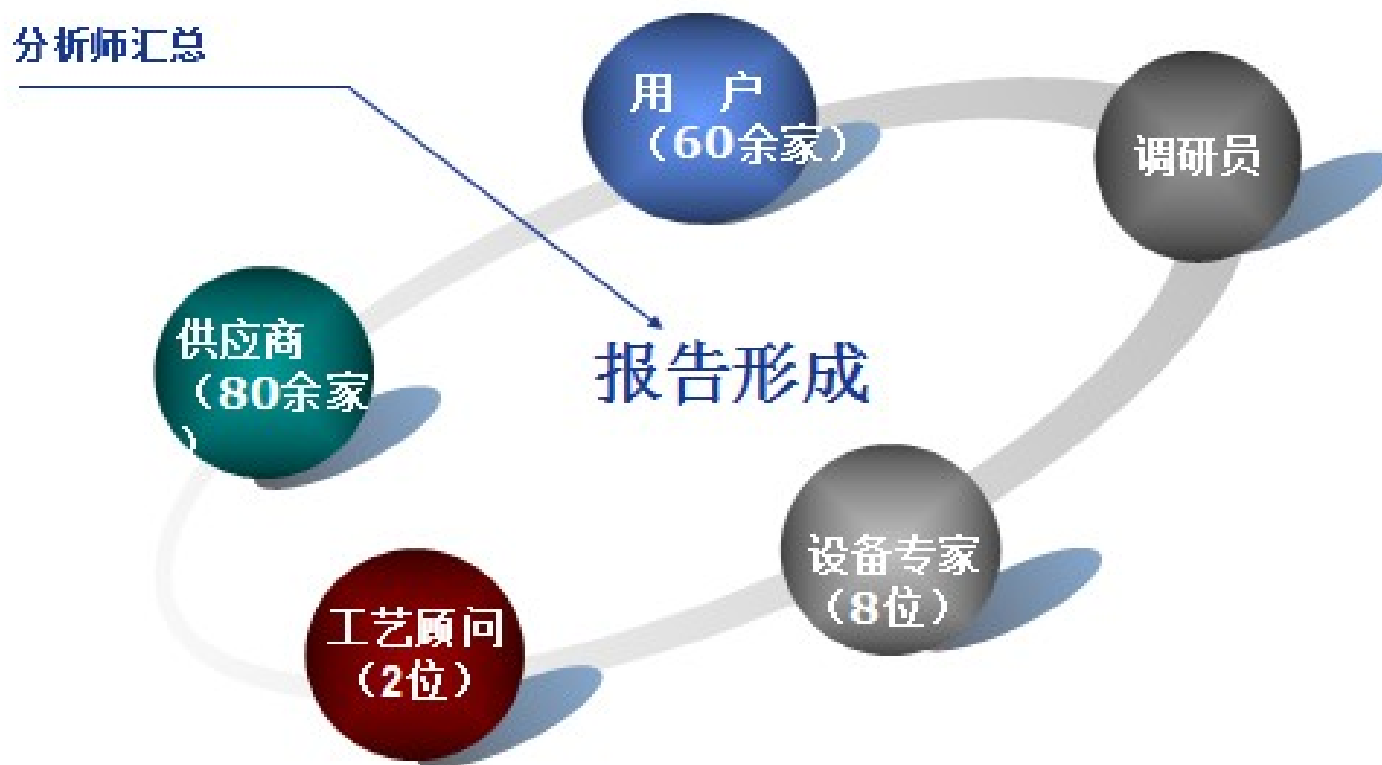
背景：设备升级与厂方扩建

主要产品：口服液、片剂、胶囊

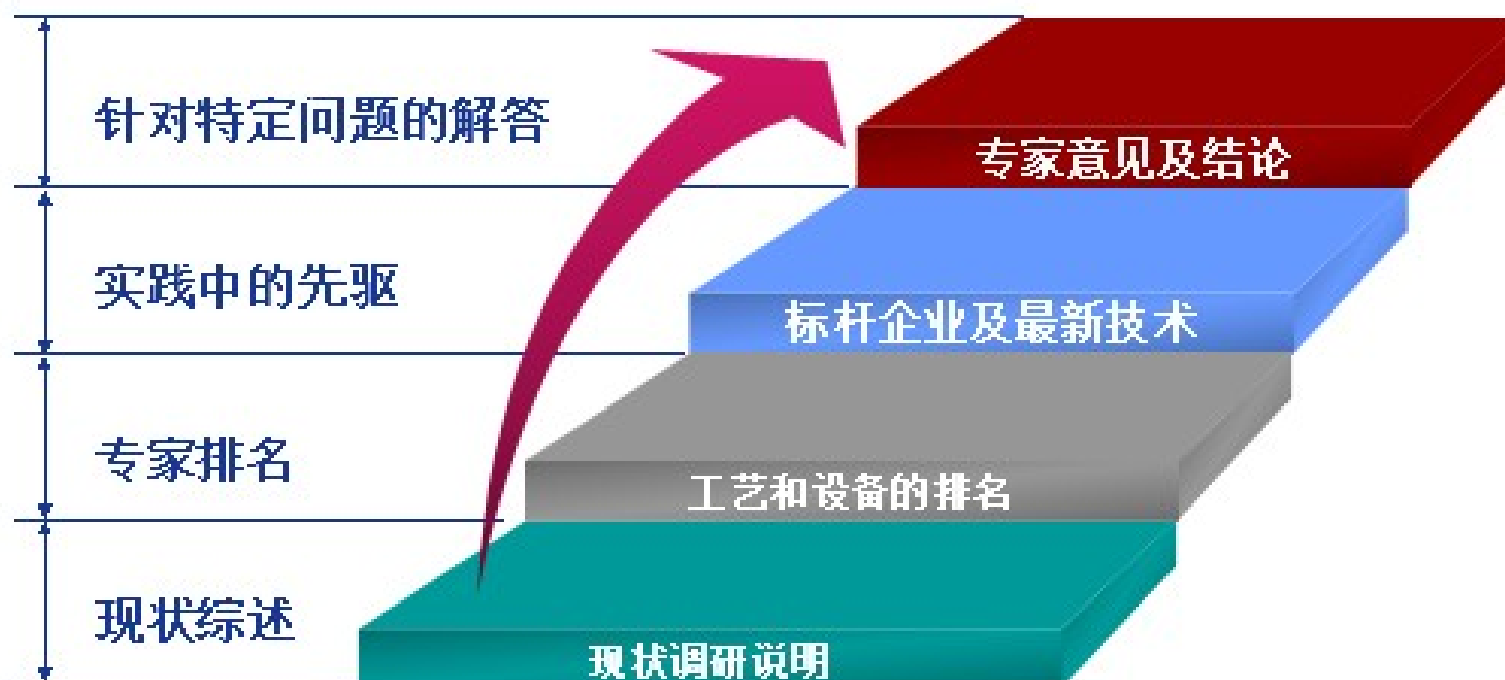
调研范围：欧洲、美国、日本和中国

对象：用户60家 供应商80家

# 案例



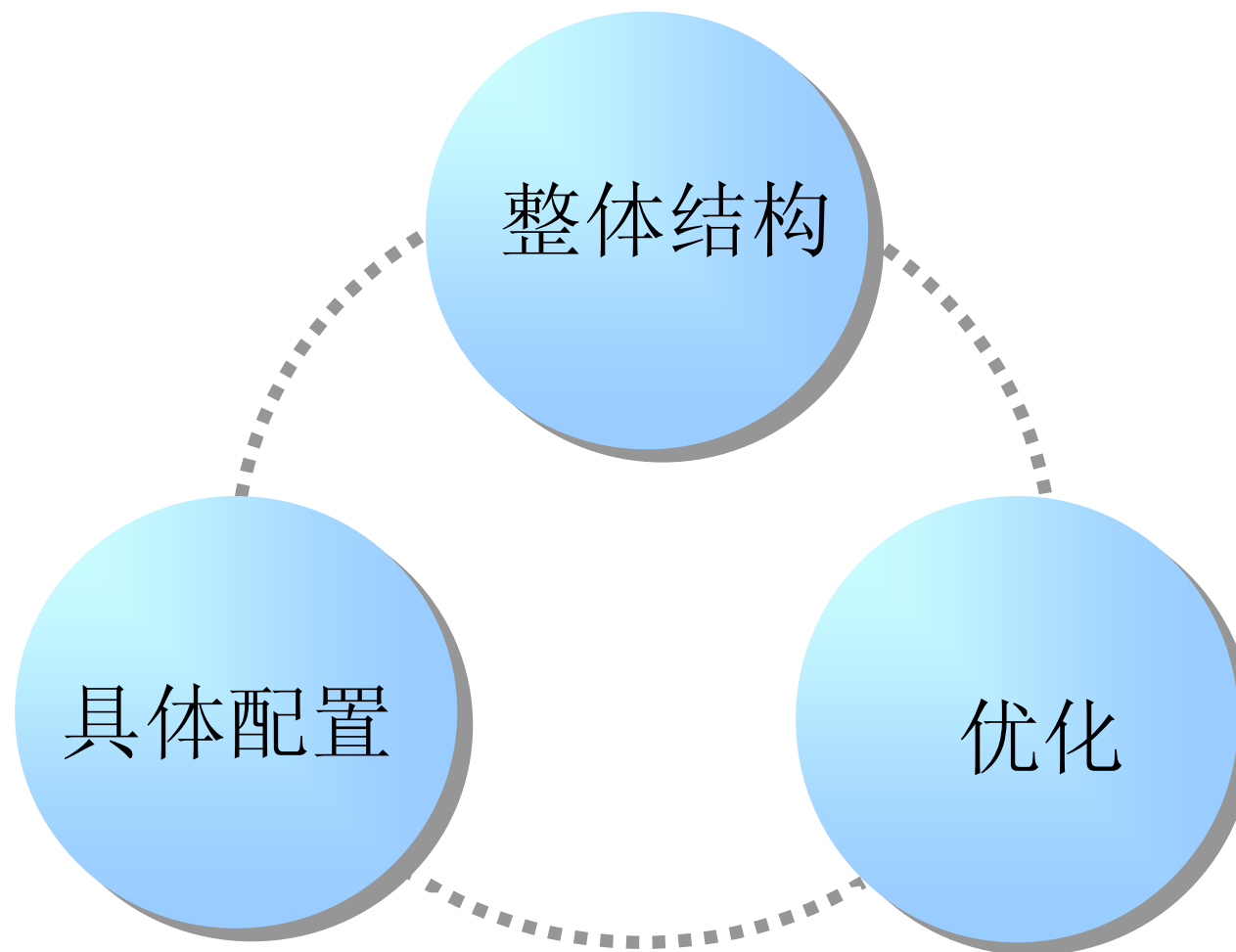
# 案例



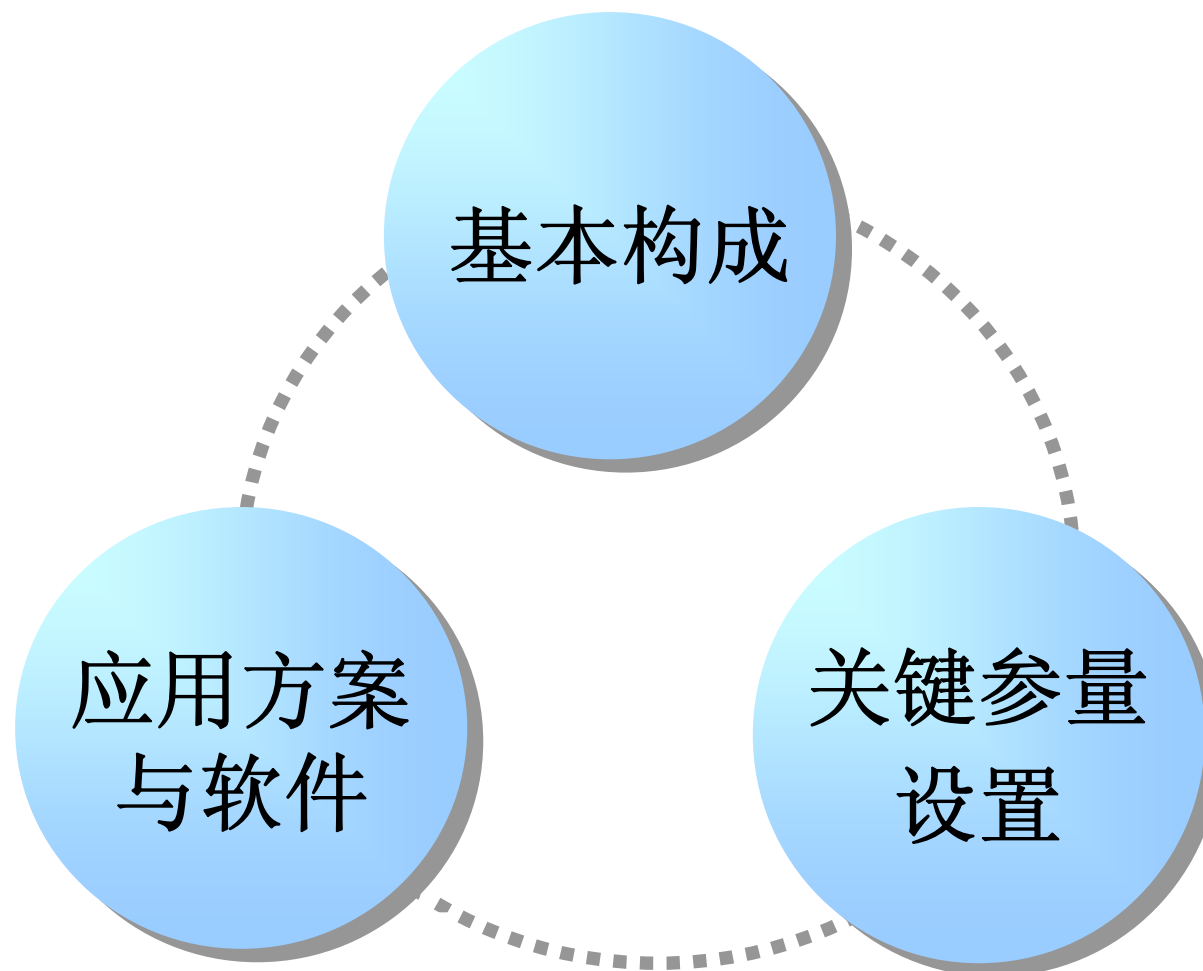


# 最优自动化方案

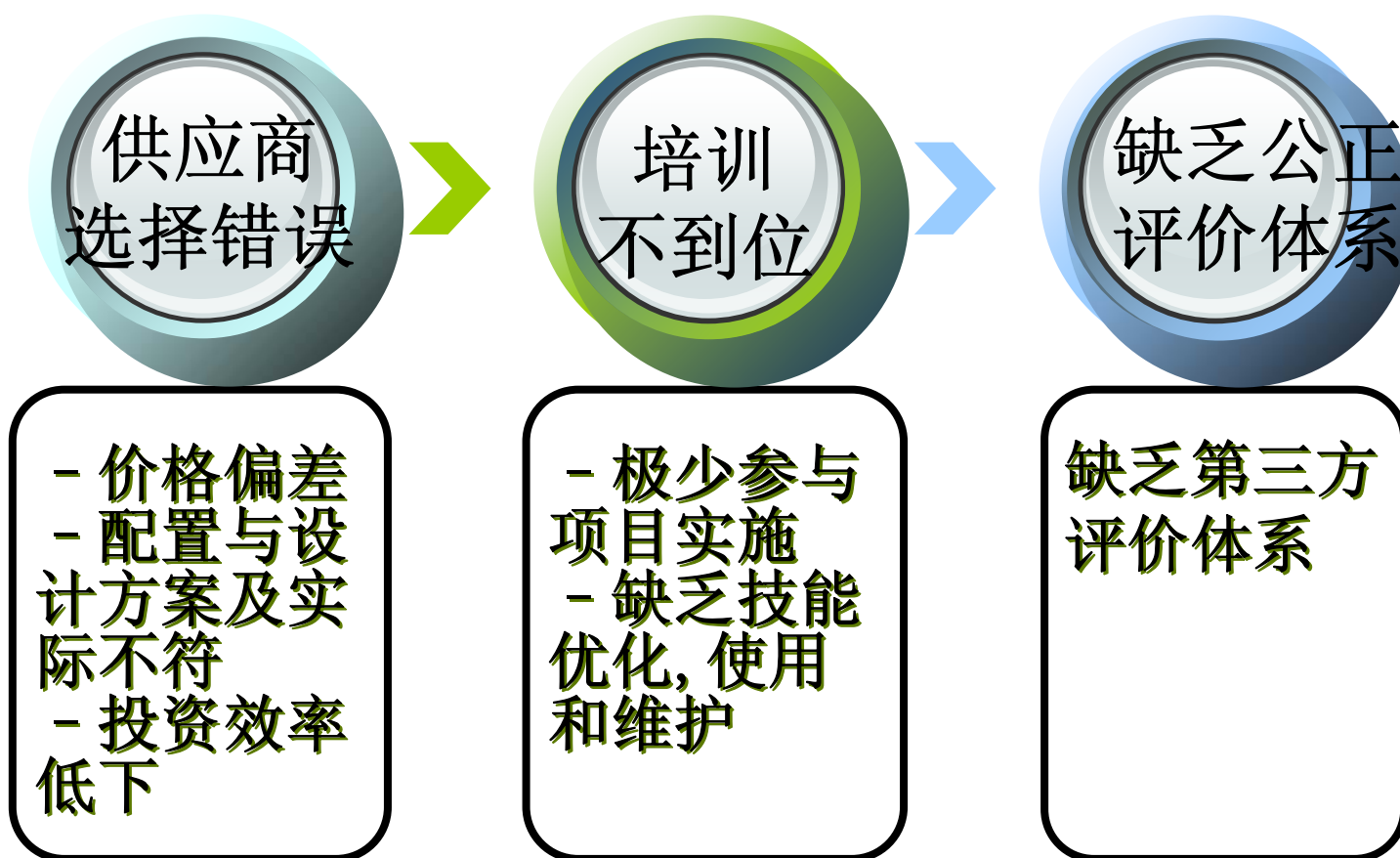
# 机器人要素



# 视觉系统要素



## 影响自动化改造效果的因素





## 工程执行

1

初步计划

2

配置与设计

3

评估（第三方）

4

优化选择

5

项目实施

6

项目监督与审查（第三方）

感谢如下组织与专家提供资料：

**Chris Buxton**

PPMA/BARA协会联盟会长，国际机器人组织理事

**Mike Wilson**

BARA理事长

**Catherine O'Mullan**博士

英国机器人协会理事，英国北爱地区职业学院教授

**IRF**

国际机器人组织

**PPMA Group**

英国加工与包装机械协会联盟

**BARA**

英国机器人与自动化协会

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**BARA**



**PMDA**

*The Process & Packaging Machinery Association*

谢谢！

