



# What makes manufacturing firms successful?

**Relating the De.:SID survey to international design research**

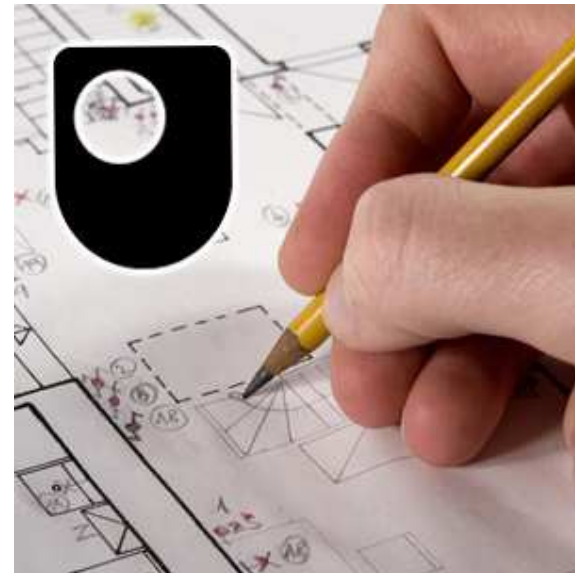
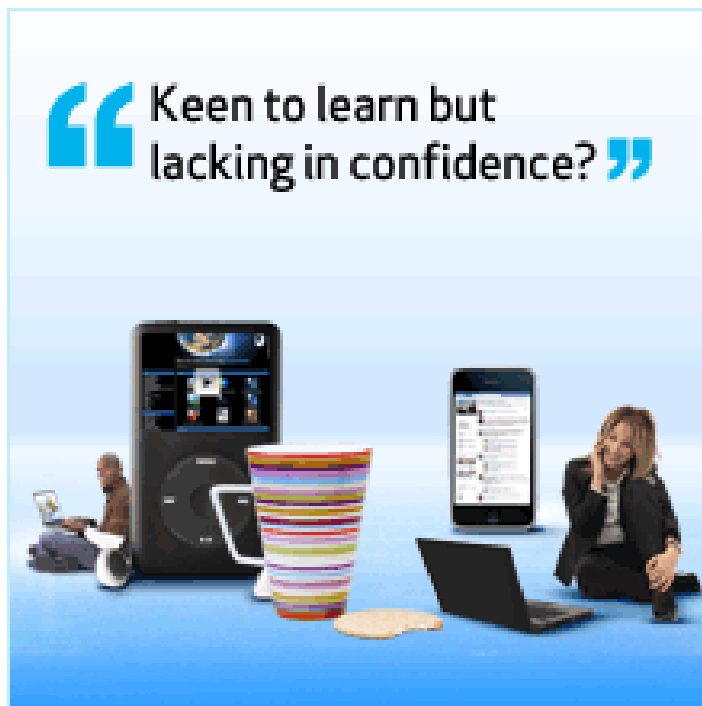
Robin Roy, Design Innovation Group, The Open University

De.:SID Strategic Design seminar, Lisbon 28 January 2011



# The Open University

- **Largest UK university** – teaches over 200,000 part-time students in UK (also continental Europe, Middle East, Africa and Asia)
- **Undergraduate/post graduate degree courses** in many subjects – design, engineering, science, arts, social sciences, etc.
- **Distance teaching via books, internet, video and audio programmes**, etc.





Design as a Company's Strategic Resource:  
a Study of the Impacts of Design

- Online survey of a stratified sample of **1505 Portuguese manufacturing firms**
- **99 firms responded (6.6%)**
- Results are mainly **detailed descriptions on the use of design** and other functions in the firms (but not related to performance of the firms)
- **Useful Dig.:SID diagnostic tool** (but based on assumed best answers to questions)

# Price and Non-price factors in competition



## NON-PRICE *PRODUCT* FACTORS

- Performance
- Aesthetics
- Reliability/durability
- Innovativeness
- Ergonomics
- Safety
- etc.*

## *PRICE* FACTORS

- Sales price
- Profit margin
- Running cost
- Servicing cost
- etc.*



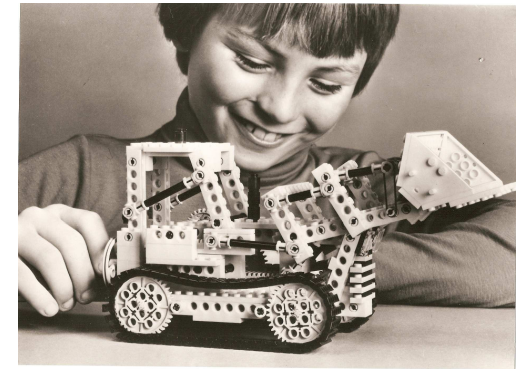
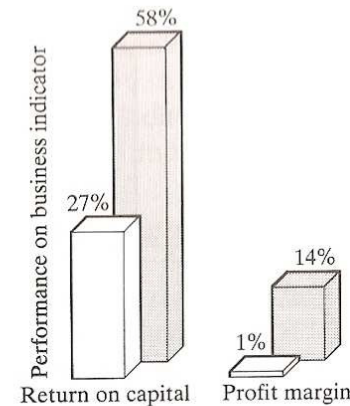
## NON-PRICE *COMPANY* FACTORS

- Brand image
- Packaging
- Advertising
- etc.*

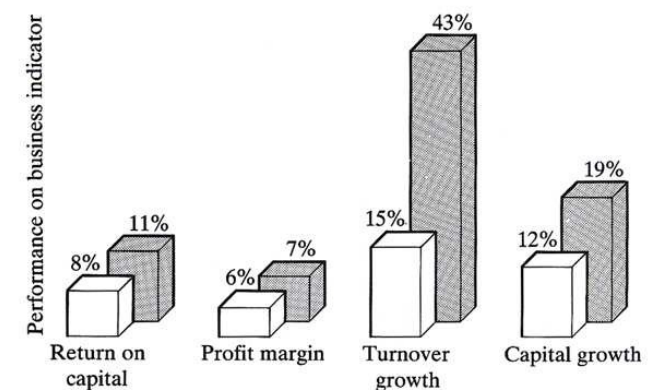
# Winning by design



- **Sample:**
- **Design-conscious** (recognised for good design v **typical manufacturing firms** from *plastics, heating, furniture, electronics industries*)
- **Differences: design-conscious v typical**
- Design-conscious firms had **broader understanding of design**
- Used **professional designers** more
- **Product development involved staff from different departments** (e.g. *marketing, design and production*)
- Developed **high quality products** (not necessarily technically innovative) that offered customers **value for money**
- **Performed better on business indicators** – *return on capital, profit margin turnover growth*



- Representative sample (27 randomly selected firms for which data was available)
- ▨ Design leaders (6 firms which performed best overall on design performance indicators)

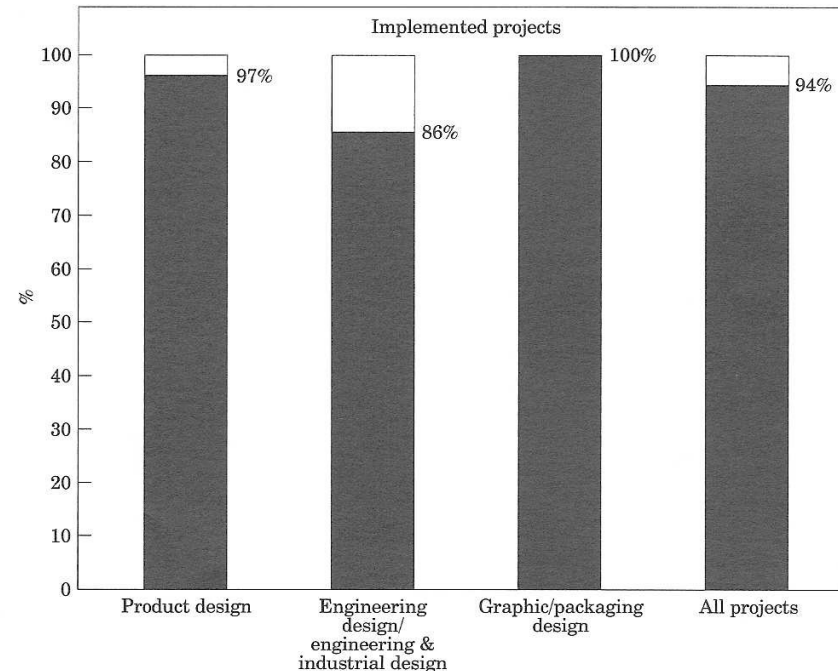


- Representative sample (28 or 31 firms for which data was available with one major loss-making firm removed)
- ▨ Design-conscious sample (8 firms)

# Commercial Impacts of Design

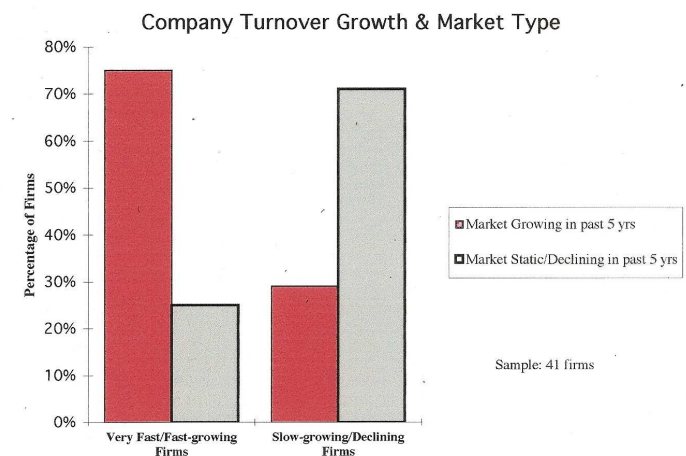


- Sample: **220 UK manufacturing firms** (interviews, post, telephone surveys)
- All had **UK Government grant to employ a professional design consultant** to help with product, industrial, engineering or packaging design project
- **Two-thirds (65%) new/improved designs put onto the market**
- **Commercial success:**
- **90% marketed products were profitable** (paid back total project investment within average 15 months)
- **Indirect benefits:**  
**Employed more designers;**  
**Improved design management skills.**



# Market Demands that Reward Investment in Design

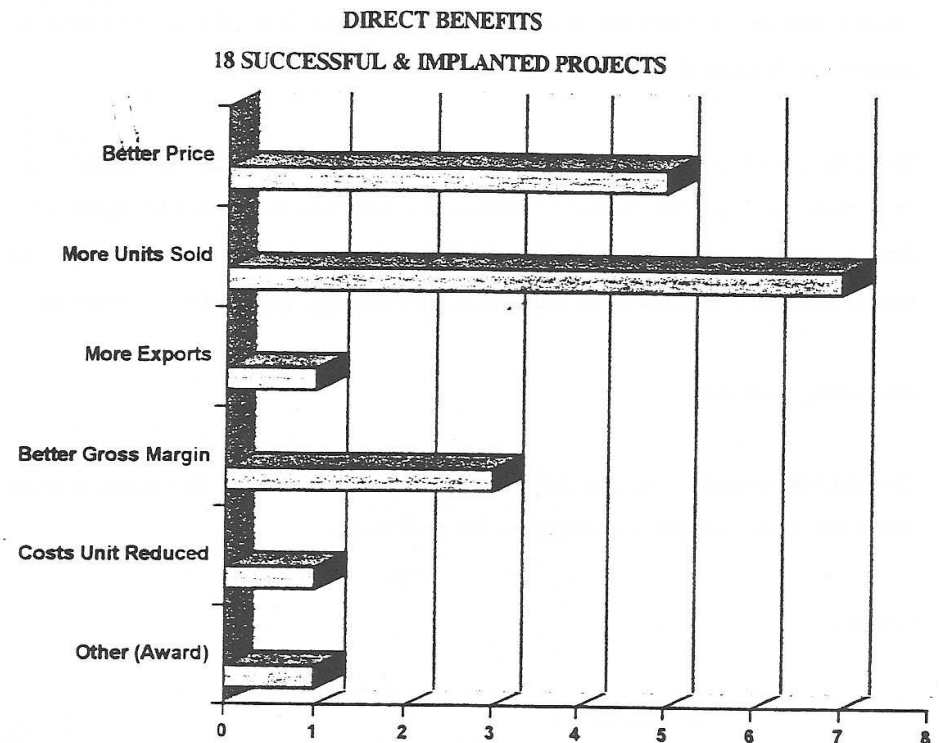
- Re-analysed data from Commercial Impacts of Design (CID)
- *Revisited 42 CID firms 8-9 years later*
- In *commercially successful* projects:
- Design was used to develop new/improved products for higher quality/value markets
- *Fast-growing firms*
- Introduced new products more frequently
- Continuously improved its existing products & ranges
- Used **modern design management** (e.g. product teams) and **modern production techniques** (e.g. CAD/CAM)
- Operated in **growing (and not over-competitive) markets**



# Spain: DZ Bilbao Design Centre support for design programme



- A Spanish researcher (*Angel Arbonies Ortiz*) used similar survey methods to the OU CID project
- Evaluated effects of employing industrial designer consultants on performance of **29 design/engineering projects in Basque manufacturers**
- **Commercial success:**
- **22 new/improved products were manufactured and marketed**
- **Over 80% of these products were estimated to have commercial benefits**, including increased sales, reduced costs and higher profit margins
- **Indirect benefits:**
- Firms learned **how to work with designers**; useful **market research**; entered **new markets**





# Netherlands: industrial design and company performance



- **Method:**

- Gerda Gemser compared matched pairs Dutch firms:  
**23 with medium/high use of professional industrial designers**  
versus **24 firms with no/low use of industrial designers**
- From two contrasting industry sectors – **home furniture and precision instruments** (medical, control, etc.)
- Questionnaires + company interviews

- **Results:**

- *Relationships between use of industrial designers and financial performance:*
- **Furniture: no significant differences**
- **Instruments: improved turnover and profits**
- **Use of industrial design provides competitive advantage only in industries** (e.g. instruments) **where ID is not already widely used**
- Other functions e.g. **R&D, manufacture, marketing as, or more, important**



# UK Design Council: characteristics of 'design alert' firms

- **Method**

- **Statistical analysis by UK Design Council of the characteristics of 250 'design alert' firms** (which benefitted financially from strategic use of design)...**compared to general sample of 1250 UK firms**
- Data collected via telephone interviews with 1500 manufacturing, retail & service firms with >10 employees

- **Main results**

	<b>'Design alert' sample (250)</b>	<b>Other businesses (1250)</b>
• <b>Developed new products/services past 3 yrs</b>	<b>71%</b>	<b>40%</b>
• <b><i>Use design in new product development</i></b>	<b>55%</b>	<b>28%</b>
• <b>Increased investment in design past 3 yrs</b>	<b>63%</b>	<b>31%</b>
• <b><i>Use design consultants</i></b>	<b>39%</b>	<b>19%</b>
• <b>Compete on innovation</b>	<b>34%</b>	<b>16%</b>
• <b><i>Designer at senior managerial/executive levels</i></b>	<b>50%</b>	<b>?</b>



# Relating De.:SID to international design research findings

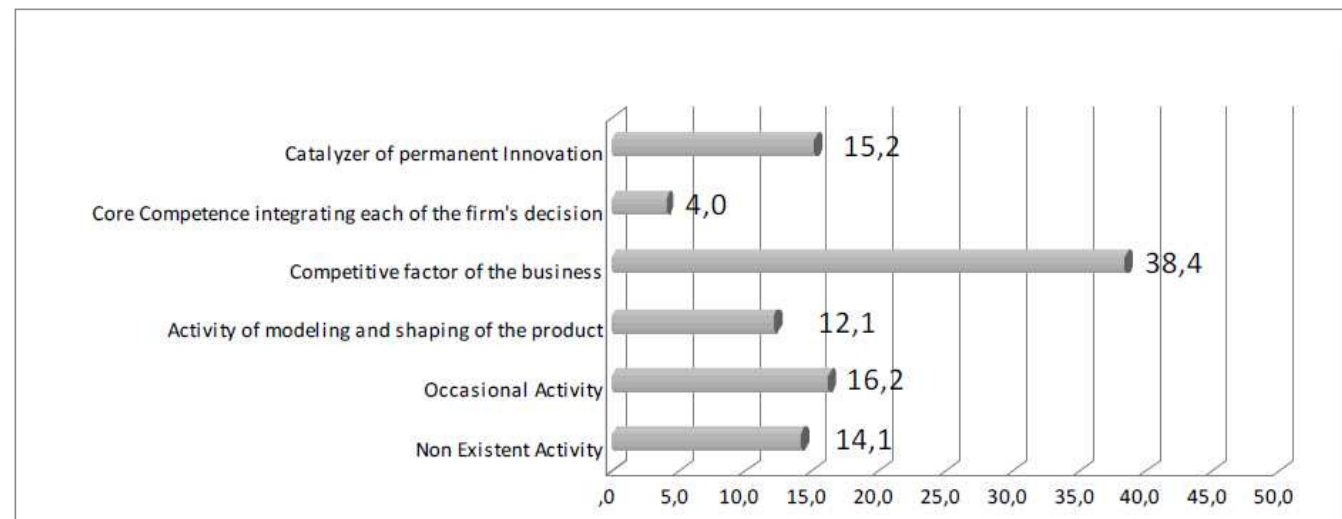
De.:SID

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# Strategic use of design

- **UK Design Council found that 17% UK firms are 'design alert'.** They use design as a strategic part of their business and are more commercially successful than other firms.
- **Positive: 15% of De.:SID Portuguese manufacturers say use design strategically** (Design ladder Level 4 ). **An over-estimate?**
- **Dig.:SID diagnostic tool: Questions 10 & 27 assess the firm's strategic use of design**





# A broad understanding of design

- OU found in successful, design-conscious firms **managers had a broader understanding of design** than in typical firms.
- **Positive: most De.:SID respondents see design as more than aesthetics**, including innovation, function, quality, etc.
- **Dig.:SID diagnostic tool: Question 9 assesses firms' understanding of design**

Table 11 – Main concepts associated with Design

	<b>N</b>	<b>Average</b>
Innovation	94	2,40
Product Development	94	2,17
Functionality	94	1,90
Quality	94	1,89
Brand Building	94	1,64
Aesthetics	94	1,55
Marketing	94	1,32



# Introduction of new products

- OU research found **fast-growing firms introduced new products more frequently than slow growing/declining ones.**
- UK Design Council found **successful design-alert businesses are twice as likely to have developed new products in past 3 years**
- **Fairly positive:** De.:SID survey found about half firms had developed new products every year 2005-2007
- **Dig.:SID diagnostic tool: Question 17 assesses rate of new product introduction**

## Innovation rate – New products/New Processes (%)

	2005	2006	2007
Introduction of New Products	47,5	50,5	53,5
Introduction of New Processes	32,3	34,3	44,4



# Improvement of existing products

- **Continuous improvement of existing products and additions to ranges** is as important to success as launching new products
- **Mixed:** De.:SID survey found around 40% firms had improved products 2005-2007
- **Dig.:SID diagnostic tool: Question 17 assesses product improvement rate**

Innovation Rate – Product's Improvement / Process's Improvement (%)

	2005	2006	2007
Improvement of Products	38,4	41,4	46,5
Improvement of Processes	34,3	36,4	40,4

# Market and competitive strategy



- Design Council and OU found that **successful firms use design to move to quality-oriented markets**  
*Compete on quality, innovation and value rather than just price*
- **Positive: Quality and innovation seen as key to business success by more De:SID respondents than price**
- **Dig.:SID diagnostic tool: no direct question to assess firm's market/competitive strategy**

Table10 – Main success critical factors of the business area of the comp.

	Frequency	%	% Valid
Quality	25	25,3	27,2
Design and Technological Innovation	10	10,1	10,9
Competition	9	9,1	9,8
Costs / price	8	8,1	8,7
Market / marketing / Brand	8	8,1	8,7
Service	6	6,1	6,5
Human Resources / Training / qualification	6	6,1	6,5





# Product development process

- OU research: **successful design-conscious firms used professional designers (internal and external) throughout the product development process**
- In successful firms **designers work in multifunctional teams**
- **Mixed**: only *half* De.:SID firms had design department  
Only *1/4 to 1/3* used external designers
- Only *half* used design throughout product development
- Only *about 20%* used PD teams or concurrent engineering
- **Dig.:SID diagnostic tool: Questions 19, 20, 23 and 24 assess PD process**

Table 45 – Design Process Phase where Design starts to be used

	Frequency	%	% Valid
Concept	40	40,4	50,6
Development	26	26,3	32,9
Detail	2	2,0	2,5
Pre-Production	9	9,1	11,4
Post-Production	2	2,0	2,5
Total	79	79,8	100,0



# Other factors in company success

- Obtaining customer information for product development
- **Questions 14, 15 in Dig.:SID diagnostic tool**
- High or Increasing investment in design staff
- **Question 11 in Dig.:SID diagnostic tool**
- Use of modern production techniques (e.g. CAD/CAM)

Table 28 – Production Technologies Used

	% "YES"
CAD/CAM	35,4
Computer Integrating Manufacturing	15,2
Flexible Manufacturing	14,1
Manufacturing Cells	12,1
Others	6,1



# Strategic design is not enough

- Successful firms that were good at design were also good at *other key functions* – market research, production, sales promotion (e.g. Lego)
- Business performance often depends whether firm is competing in *markets growing* (and not *over-competitive*)
- Commercial benefits of using industrial design depends on the *industry sector* (e.g. toys, furniture v instruments, electronics)





# Interaction of business success and design investment

- ***Two-way interaction*** between business success and use of design
- **Profitable firms more likely to invest in design than loss-making ones**
- **Loss-making firms that can't afford to invest in design** to develop new and improved products and ranges **may be caught in a *cycle of decline***

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