

Cambridge Institute for Manufacturing

Engineering Re-use Tools

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Francis Hunt

fhh10@eng.cam.ac.uk



What is Engineering Re-use?

Engineering re-use is the business strategy of using existing technological assets that a company controls in the creation of new assets.

Re-use is successful when the resources used to obtain an acceptable result are less than those that would have been required to create the new asset from scratch.

Potential advantages and disadvantages

Advantages

- reduced time
- reduced cost
- reduced resource
- reduced risk
- improved quality

Disadvantages

- inability to improve past decisions
- stifling of innovation
- common weak points
- business re-organisation implications
- customer disenchantment
- increased risk

Key questions

- how to identify re-usable assets?
- how to classify and analyse re-usable assets?
- how to decide whether to re-use or not?
- how to implement re-use in the company?

Engineering Re-use Guide Overview

Front-end

- Introduction to reuse
- Benefits & challenges
- Scope & structure



Audit

- Asset identification
 - finding & labelling
- Asset assessment
 - potential for re-use
- Re-use maturity level



Implementation

- Re-use policy
- Asset analysis
- Re-use implementation guidance

Structured by:

- re-use framework
- re-use maturity level
- knowledge type

Appendices

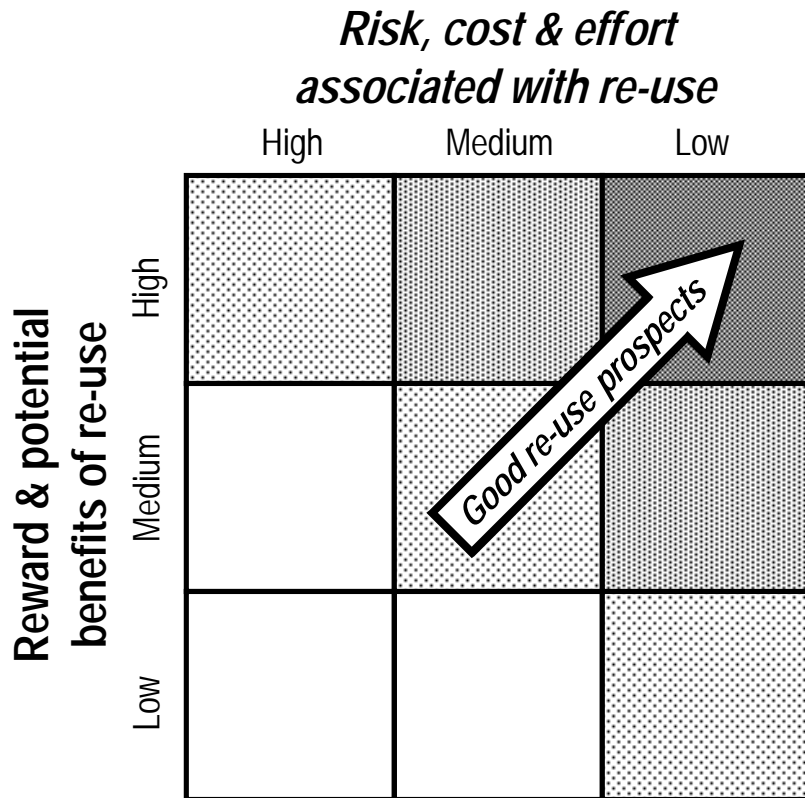
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|-------------------------|--------------------------|-------------------|
| • Knowledge management | • Change management | • Design |
| • Technology management | • Culture & organisation | • Risk |
| • Strategy | • Tools & techniques | • Further reading |

Asset Identification

Business model - Value chain

		Research	Design	Supply	Production	Distribution	In-service	End-of-life	
		Technology types	Tangible	Parts					
Facilities									
People									
Hardware									
Intangible	Software		Software						
			Information						
			Designs						
			Systems						
			Processes						
	Knowledge		Knowledge						
			Decisions						
			Structures						
			Relationships						
			Culture						
Organisation									

Asset Assessment

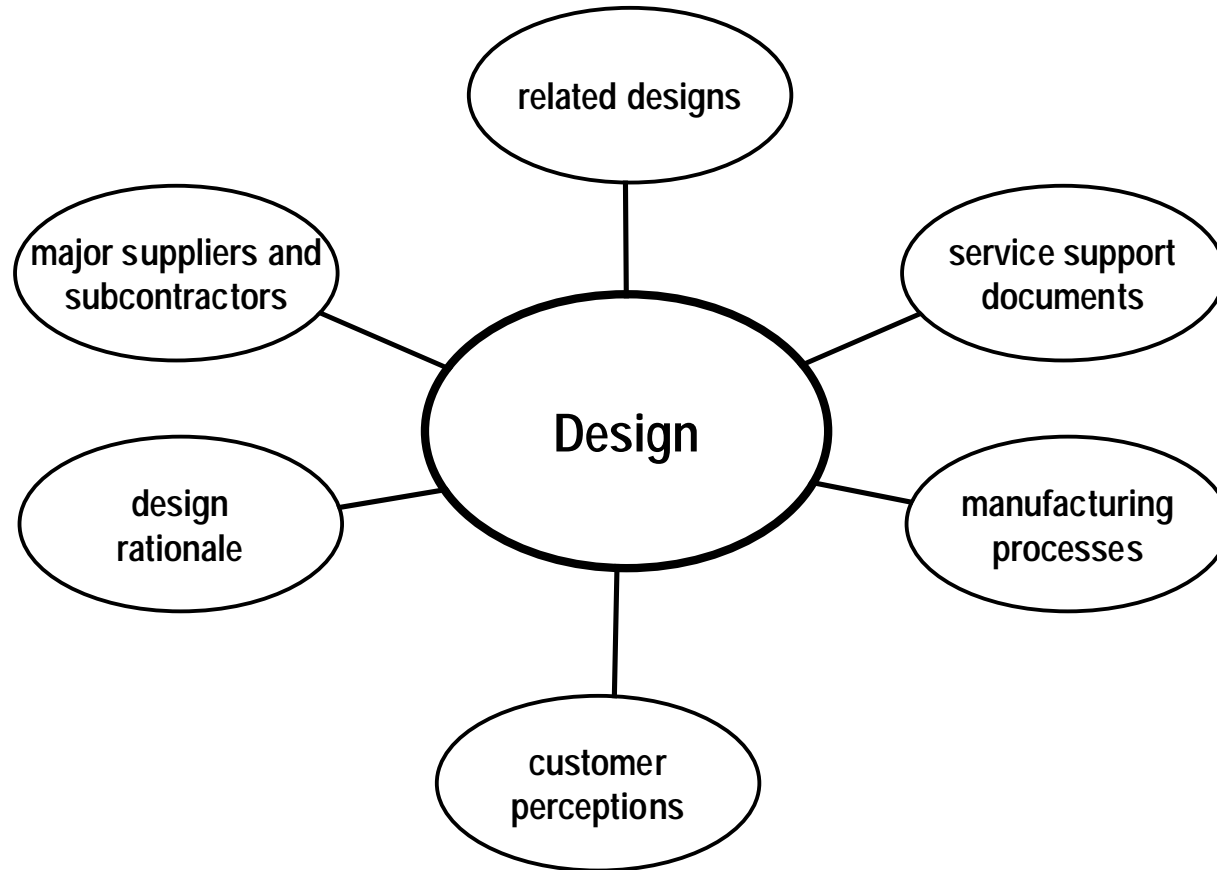


Factors

- Market
 - fit to requirements
 - customer perceptions
 - market coverage and positioning
- Money
 - employee time
 - parts required
 - equipment required
- Minutes
 - lead time (parts, equipment, distribution channels, support channels, recruitment)
 - design time (from scratch or integrating)
 - finding and comprehension time
 - manufacturing time
- Manpower
 - company competencies (current & desired)
 - employee satisfaction
- Knowledge requirements
- Risks

	Maturity Level 1 <i>Opportunistic</i>	Maturity Level 2 <i>Occasional</i>	Maturity Level 3 <i>Project-based</i>	Maturity Level 4 <i>Product-wide</i>	Maturity Level 5 <i>Organisation-wide</i>
Re-use activity	Adhoc	Some systematic instances	Systematic within individual R&D projects	Systematic within and across design & development	Systematic across the organisation
<i>Process & systems</i>	No established re-use processes, tools or methods	No established re-use processes, tools or methods have been, although some re-use activity is apparent	Re-use is incorporated into R&D project management processes and activities, supported by appropriate tools and methods	Re-use is incorporated into and across design and development processes, supported by appropriate tools and methods	Re-use processes are well established, and integrated systematically with other business processes, supported by appropriate tools and methods
<i>Management</i>	Re-use is not managed, and is not repeatable	Some re-use objectives and metrics have been identified, although re-use is not proactively managed, and is not repeatable	Re-use objectives and metrics are incorporated into project management procedures and practices; re-use is managed proactively and is repeatable on a project-by-project basis	Re-use objectives and metrics are incorporated into design and development procedures and practices; re-use is managed proactively and is repeatable across product lines	Re-use objectives and metrics are incorporated into business procedures and practices; re-use is managed proactively and is repeatable across the business
<i>Organisation, culture and human resources</i>	Little or no awareness of re-use	Growing awareness of re-use, with some re-use initiatives apparent	Re-use awareness is high in parts of the business, with re-use goals included in project and staff appraisal systems	Re-use is part of the way that the organisation does business, reflected in reward systems and R&D structure	Re-use is part of the corporate culture, reflected in reward systems and organisational structure
<i>Policy, strategy, benefits and performance</i>	Re-use concepts not apparent in policy, objectives and strategy; little or no awareness of the potential benefits of re-use	Some re-use concepts apparent in policy, objectives and strategy; some benefits of re-use have been identified and realised	Re-use is included explicitly in department or group policy, objectives and strategy; benefits of re-use have been identified and realised.	Re-use is included explicitly in business unit or company policy, objectives and strategy; significant benefits of re-use have been identified and realised	Re-use is embedded in corporate policy, objectives and strategy; the benefits of re-use that have been realised are changing the nature of the business
<i>Infrastructure</i>	Little attention or effort has been directed towards developing effective IT and knowledge management systems	Some attention and effort has been directed towards developing effective IT and knowledge management systems	Effective IT and knowledge management systems have been developed to support R&D project management and execution, including re-use considerations	Effective IT and knowledge management systems have been developed to support design and development processes, as part of a company-wide initiative, including re-use considerations	Integrated and effective IT and knowledge management systems have been developed across the company, including re-use considerations

Asset analysis



Re-use process framework

