

# Technology Transfer

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# 1 Technology Field & Knowledge of a company

## Example

Product Technologies	Technology which does guarantee the function of the product	GSM (for mobil communication)
Production Technologies	Technology which does support the production/ manufacturing process	stamping, pressure, vacuum,
Materials Technology	Technology which is included in the product	Silicium, Plastics

Supporting Technologies/Methods/ Techniques & Processes	<ul style="list-style-type: none"> <li>- lean production</li> <li>- QFD (Quality Function Deployment)</li> <li>- FMEA</li> <li>- TRIZ</li> <li>- Simultaneous Engineering</li> </ul>	<ul style="list-style-type: none"> <li>- JIT (Just in Time)</li> <li>- SCD</li> <li>- Efficient Customer Response</li> <li>- WOIS</li> <li>- DFMA</li> <li>- 6σ</li> </ul>
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Production Technologies			Product Technologies			Product	Business		
Eroding	Milling	Crystal Growing	Diesel (V6/V8/..)	Turbo-prop	JET/ Turbo engines	<b>Engine</b>	Aero industry	Auto-mobil	sports/ fun
X	X			X			(X)		X
X	X	X			(X)		(X)		
			X					X	
A	B	C	bla	blabla	...	<b>product X</b>	...	...	...

technology field      business field

## 2 The Rolls Royce Example

1990:

new requirements for aircraft engines concerning noise, emissions, fuel consumption to fulfil until 2005.

- Professor of TU Munich had the innovation to fulfil requirements (noise, emissions, weight, fuel consumption)
- BMW had the money (willing to invest)
- RR had the knowhow
- KHD (Deutz Frankfurt) had the facility because they were repairing military engines

→ Joint Venture “BMW-RR“

They started and in 1995 they were able to build engines that fulfil the requirements.

→ build up a new facility in Berlin-Dahlewitz (because there were skilled people from old Interflug & Ludwigsfelde)

It worked because of the following reasons:

- combined experience & knowledge data base to avoid cost increasing failures in sections of development, production & marketing
- risk shared by both partners one technically, one financially
- degression of cost through central purchase and increasing/increased utilisation of existing resources
- avoidance of duplication & multiple activities (R&D) of the advantage of cooperating partners
- balanced resource deficits through efficient additional requirements

problems:

- Respect & trust in partners capabilities (*the product will be a competitor to other RR-products*)
- language/culture
- different philosophy (IT, Procurement)
- Technical standards (*inch ↔ cm*)
- (distance of location)
- no common agreement on customer structure (*military or civil application only?*)
- team working capability of your own employees

→ now RRD (=BMW-RR after BMW went out) is benchmark for certain processes now taking in RR-group.

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### 3 bad example: CARGOLIFTER

build up an airship to move heavy load (up to 160to), without depending to landing space. Good to manoeuvre

+ excellent vision	
+ good marketing (they caught up a lot of money)	- no project management - low technical knowledge - no milestones were linked to contribution → no pressure to achieve goals

500 million € just gone!!!

## 4 evaluation of technology

example: Mobil phone

3 Alternatives on technology (A,B & C)

	criteria	Importance							sum of importance	Weight factor
		1	1		1	1	1	1		
1	Weight	1	1		1	1	1	1	3,5	3,5/28
		1	2		3	4	5	6		
2	Design	2	2		2	2	2	2	2,0	2,0/28
		2	3		4	5	6	7		
3	No of location (usable freq)	3	3		3	3	3		1,0	1,0/28
		3	4		5	6	7			
4	Power Supply	4	4		4	4			6,0	6,0/28
		4	5		6	7				
5	Display Size	5	5		5				3,5	3,5/28
		5	6		7					
6	Survival factor	6	6						5,0	5,0/28
		6	7							
7	Multi functional	7							7,0	7,0/28
		7								
28									28	1

How the 3 Alternatives fulfil the criteria

criteria	A		B		C	
		* weight factor		* weight factor		* weight factor
1	3	3*3,5/28	2		1	
2	2		2		1	
3	3		3		1	
4	2		2		2	
5			3		3	
6			2		2	
7						

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### 4.1 Evaluation method by Fraunhofer Institute

	1	2	3	4	5	6	7	8	9
	negative impact				current standard	positive impact			
production costs	>Mio		>500€		300k€	200		150	100
material costs									
effect on costs									
technical aspect (e.g. noise level)									

## 5 TT-Example

DLR ↔ Toyota (DLR – Deutsches Zentrum für Luft- und Raumfahrt)

License:

- patents
- duration of use
- executively
- costs
- use & sales
- (Reference to) support agreement
- invalidity statements (“it has to be usable for Toyota, otherwise contract is invalid” → increase the interest of DLR to honestly teach Toyota)

support:

- consultation fee (70 -120€/h)
- steering committee
- min. support / max. support
- penalties (for delays)
- start & end

→ see also contract example from the “IHK-Leitfaden zum Technologietransfer”

### 5.1 how to measure at Toyota

Technology skill level →	1	2	3	4	5
process 1					☺
material 1				☺	
inspection methods					☺
defect repair					
data assessment					
further development/ new probes					

☺ → Level that you want to reach

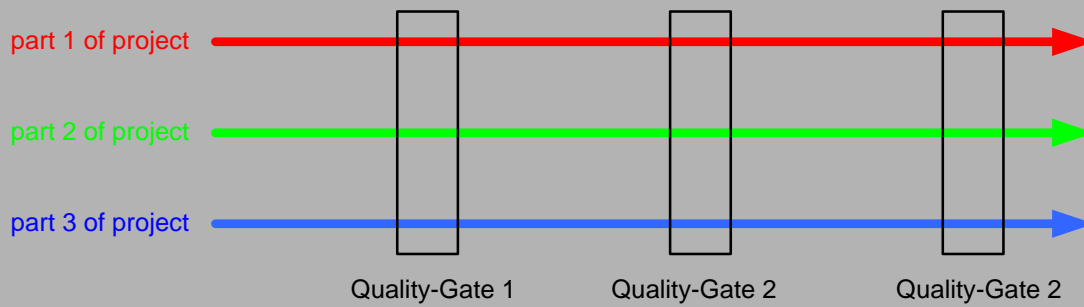
→ **mark** the progress over time by coloring the reached skill level.

→ If you meet the ☺ you do not need support anymore in that field

## 6 Additional Notes

### note to lecture (slide 51):

Quality Gate:



If 1 part has not reached the quality gate, the others will be stopped and all resource were spent to the one to catch up. (e.g. part 1 = optical, part 2 = mechanical, part 3 = electronic)