

*Presentation at the OECD Workshop on
"The Development of Practical Tools for
Improving the Innovation Performance
of Firms "
OECD, Paris, June 30, 1997*

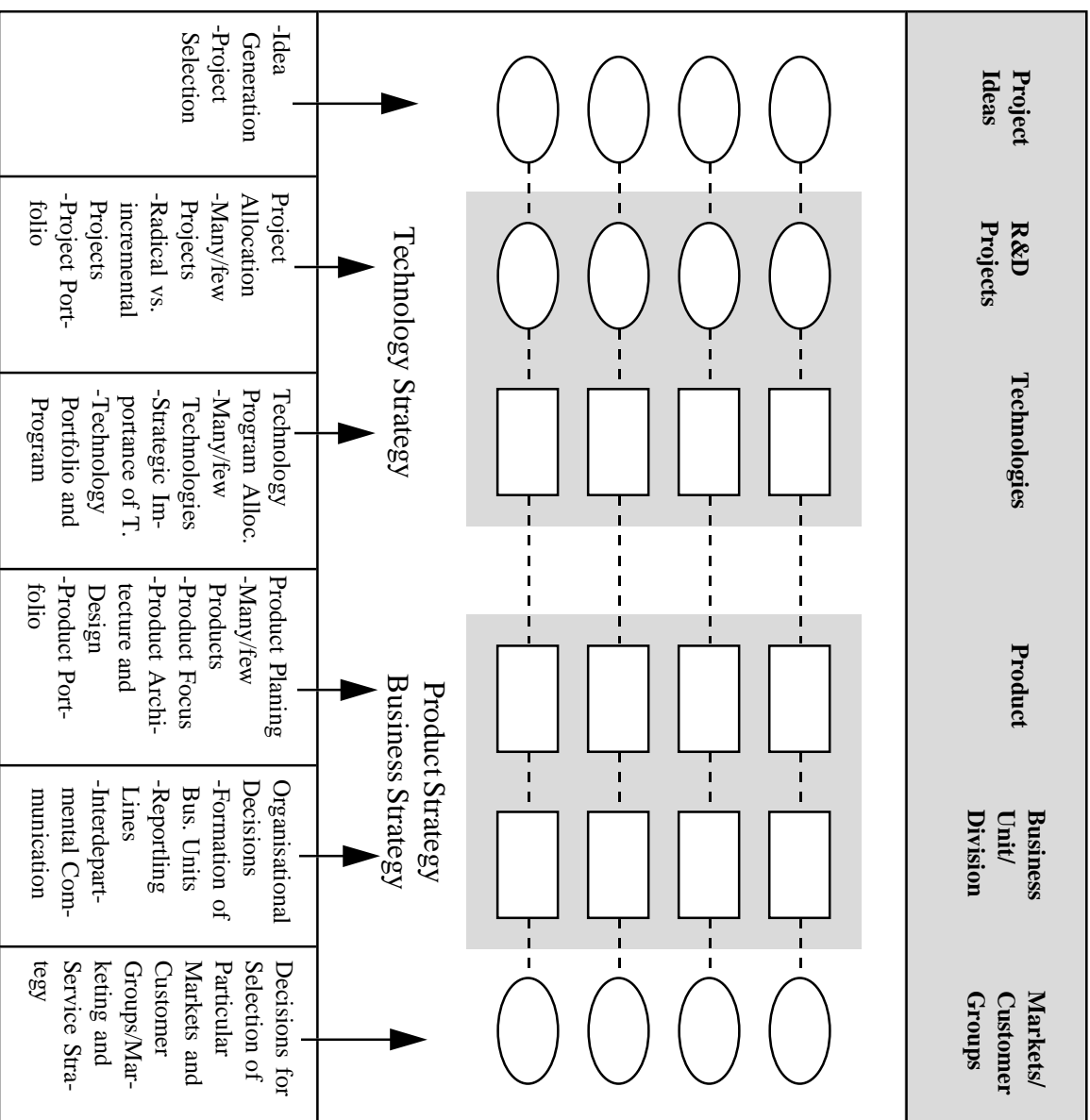
***Tools for Assessing Technical
Capabilities within Firms:
Examples from German and Swiss Corporations***

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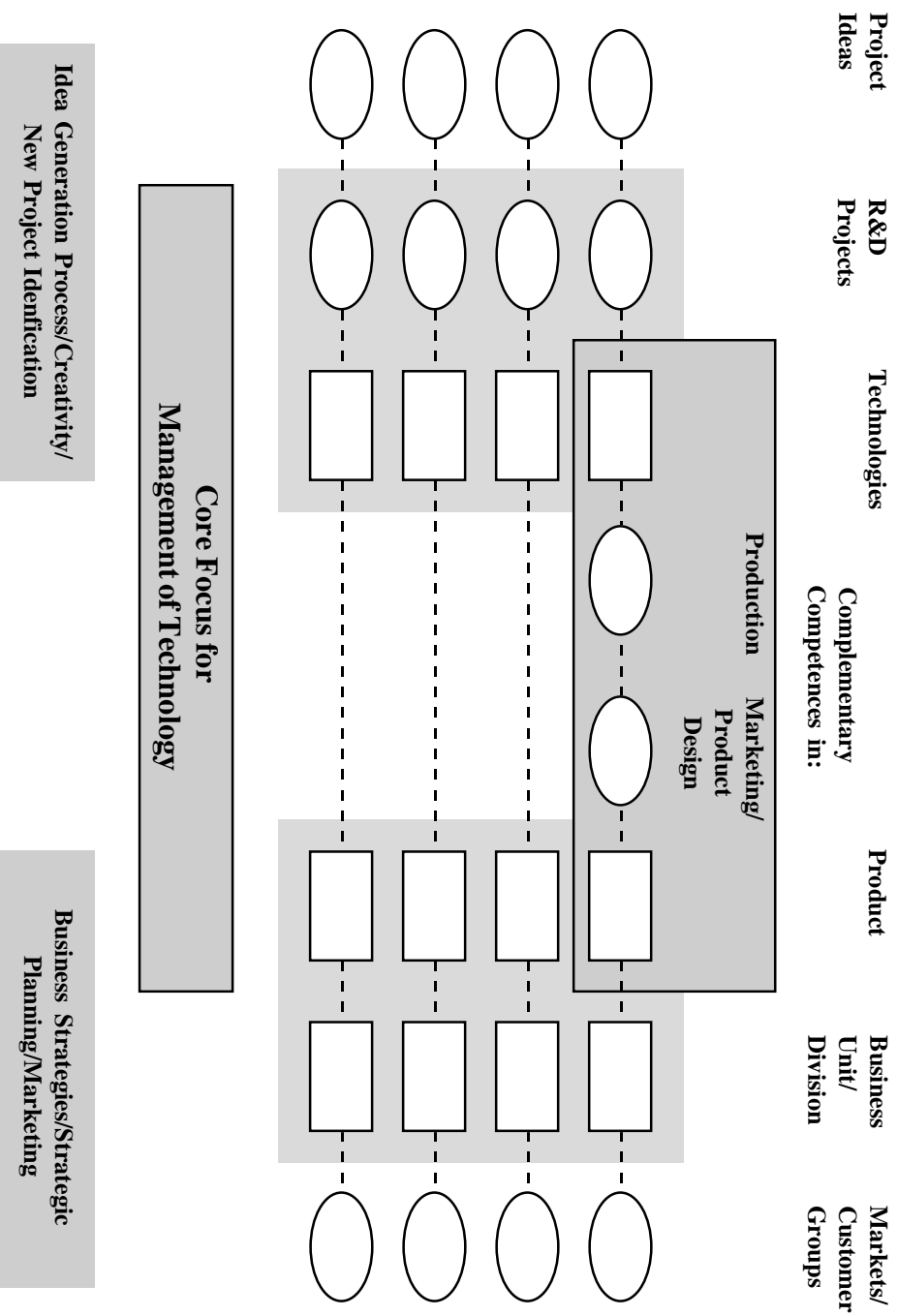
Introduction to the Center for International Management and Innovation

- **Master Curriculum on International Management with Focus on**
 - International Management of Technology
 - Competence-based Strategy in Transnational Corporations
- **Research Projects and Databases**
 - International R&D and Innovation Study (Interis-Study)
 - Benchmarking Management of Technology at the Corporate Level (SMTC)
 - Distributed Competence Metric (DCM)
 - Core Competence Assessment (CCA)
- **Close Collaboration with Corporations in German-speaking Countries/ Development and Implementation of Strategic Management of Technology**
 -
- **Refinement of Concepts and Tools for "Managing Competences Across Institutional Boundaries"**
 - Distributed Competences within Firms (Competence-based Teams)
 - Distributed Competences across Firms (Competence-Alliances)

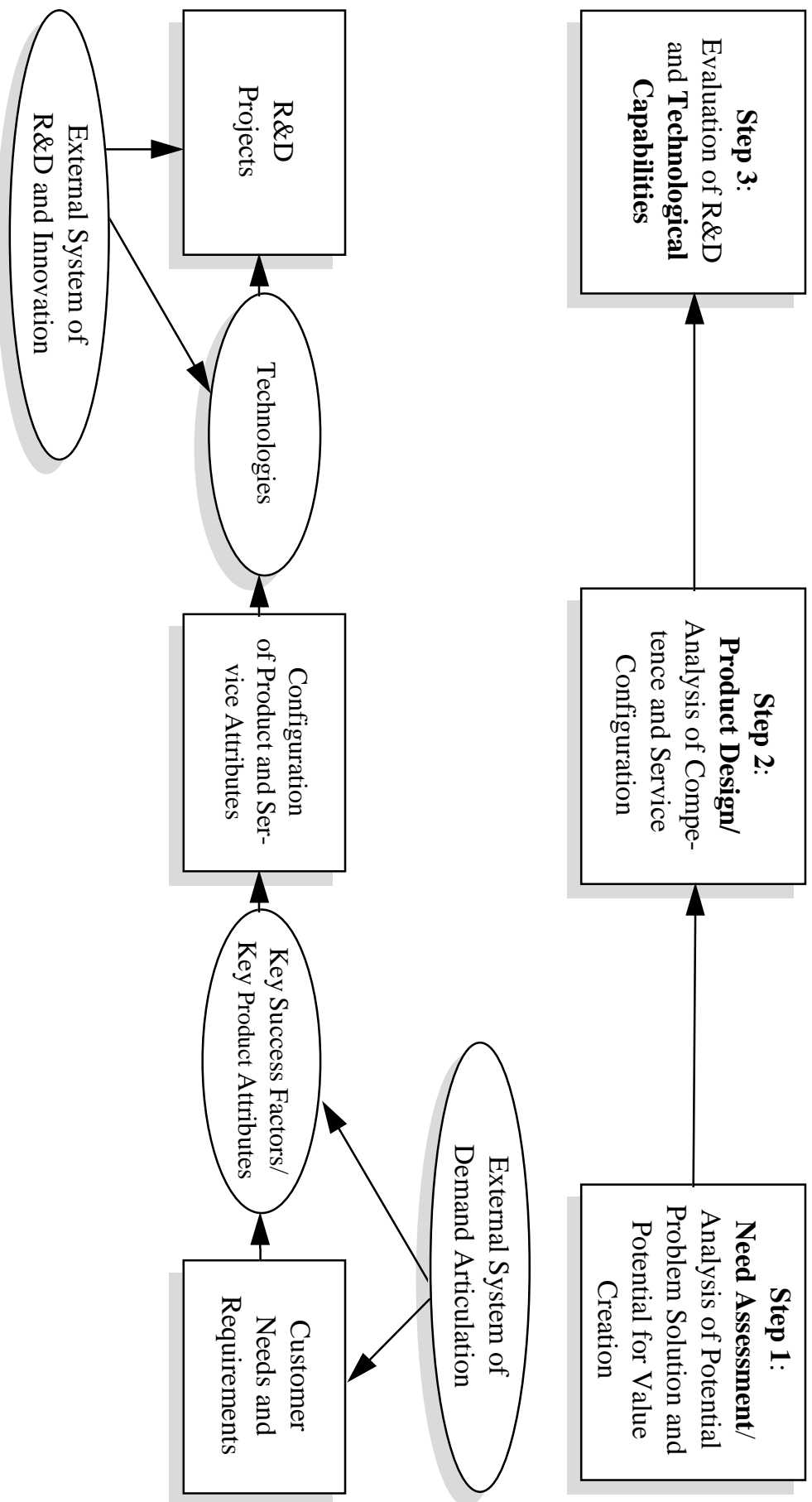
Technological Capabilities in Multi-Technology and Multi-Product Firms



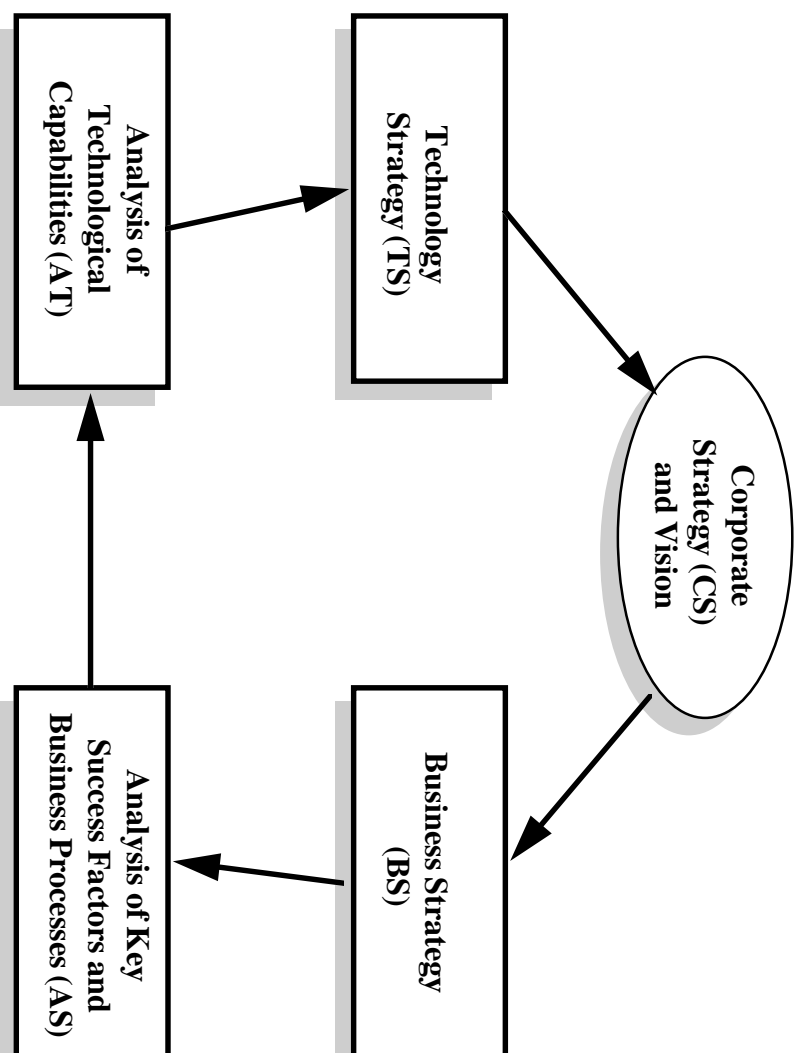
Technological Competences: The Ability to Deploy Complex Bundles of Resources in a Directed, Value-Enhancing Mode



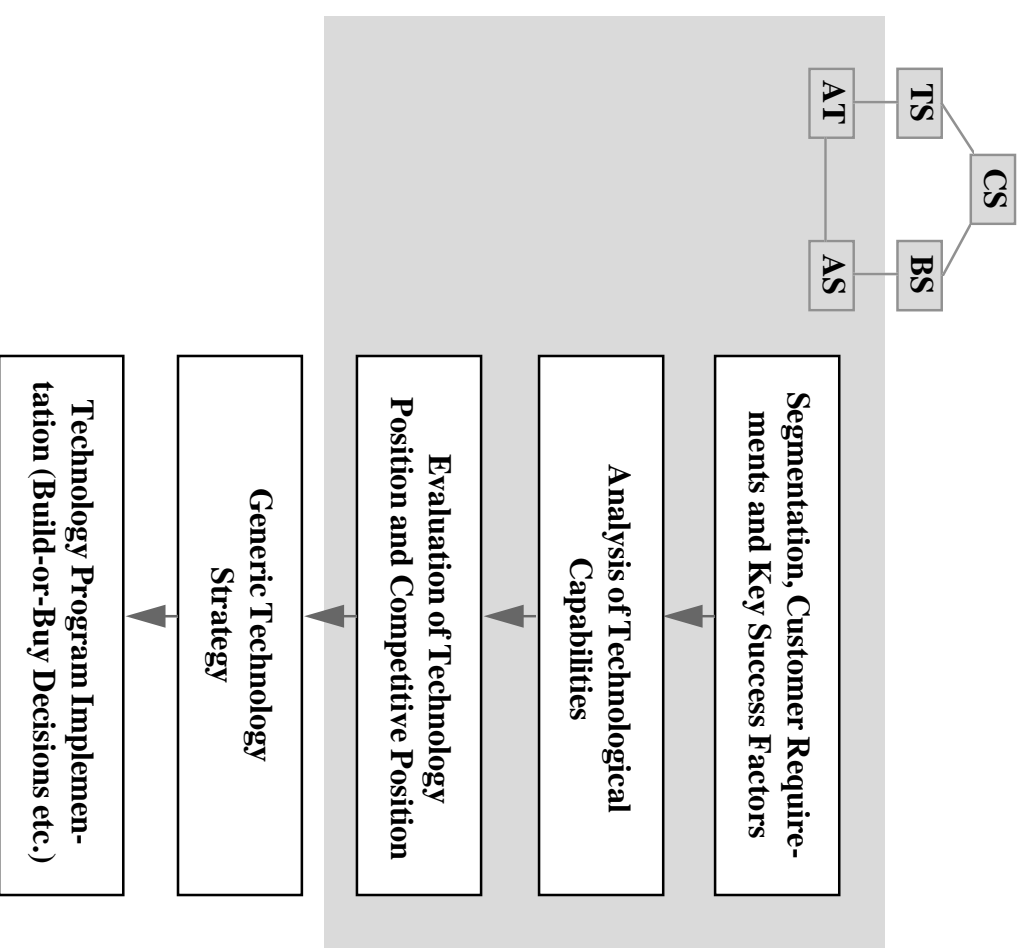
Assessing Technological Capabilities on the Basis of their Strategic Fit with Customer Needs/Key Product Attributes



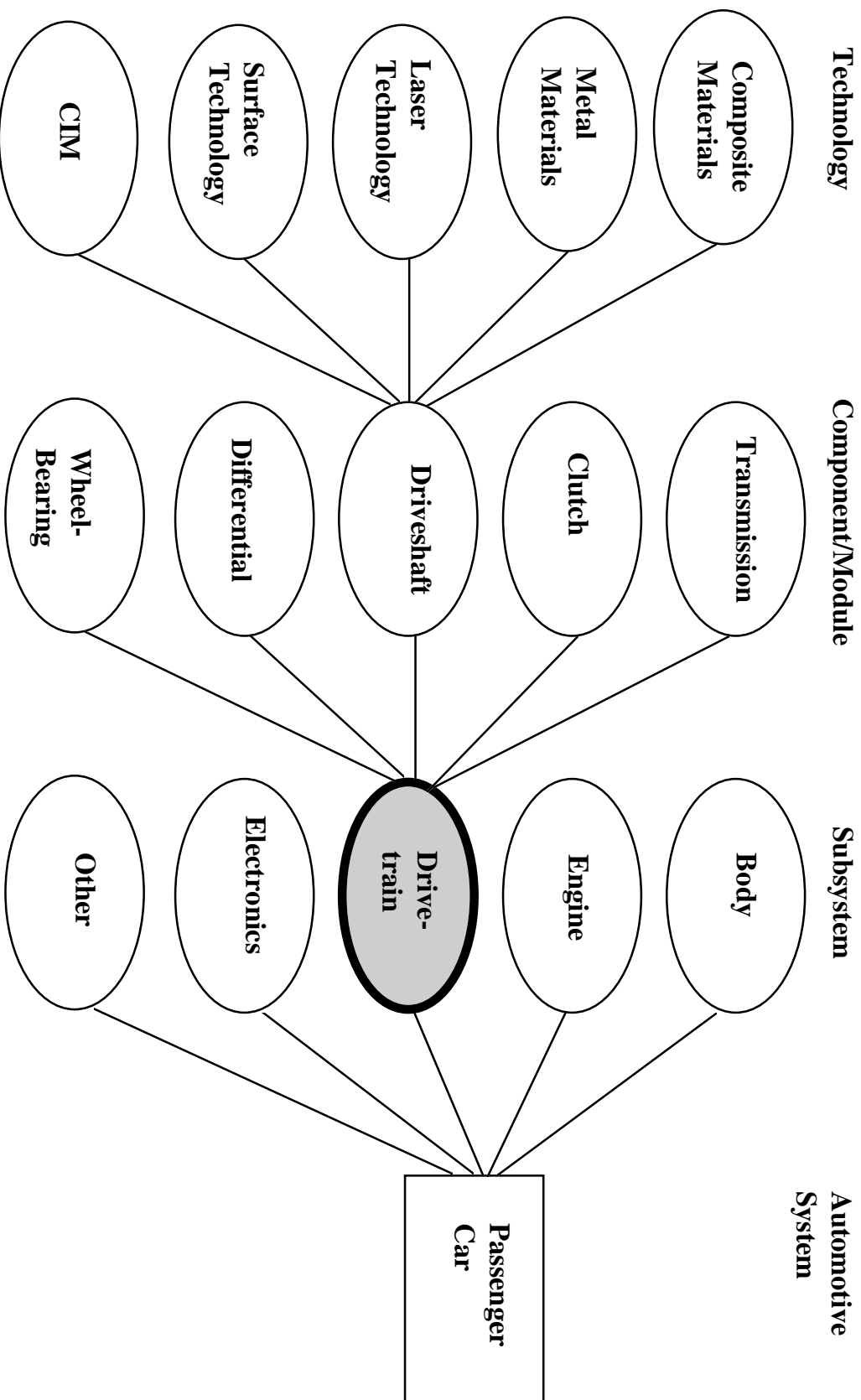
Technologies, Business Unit Strategy and Corporate Strategy must be Closely Interconnected



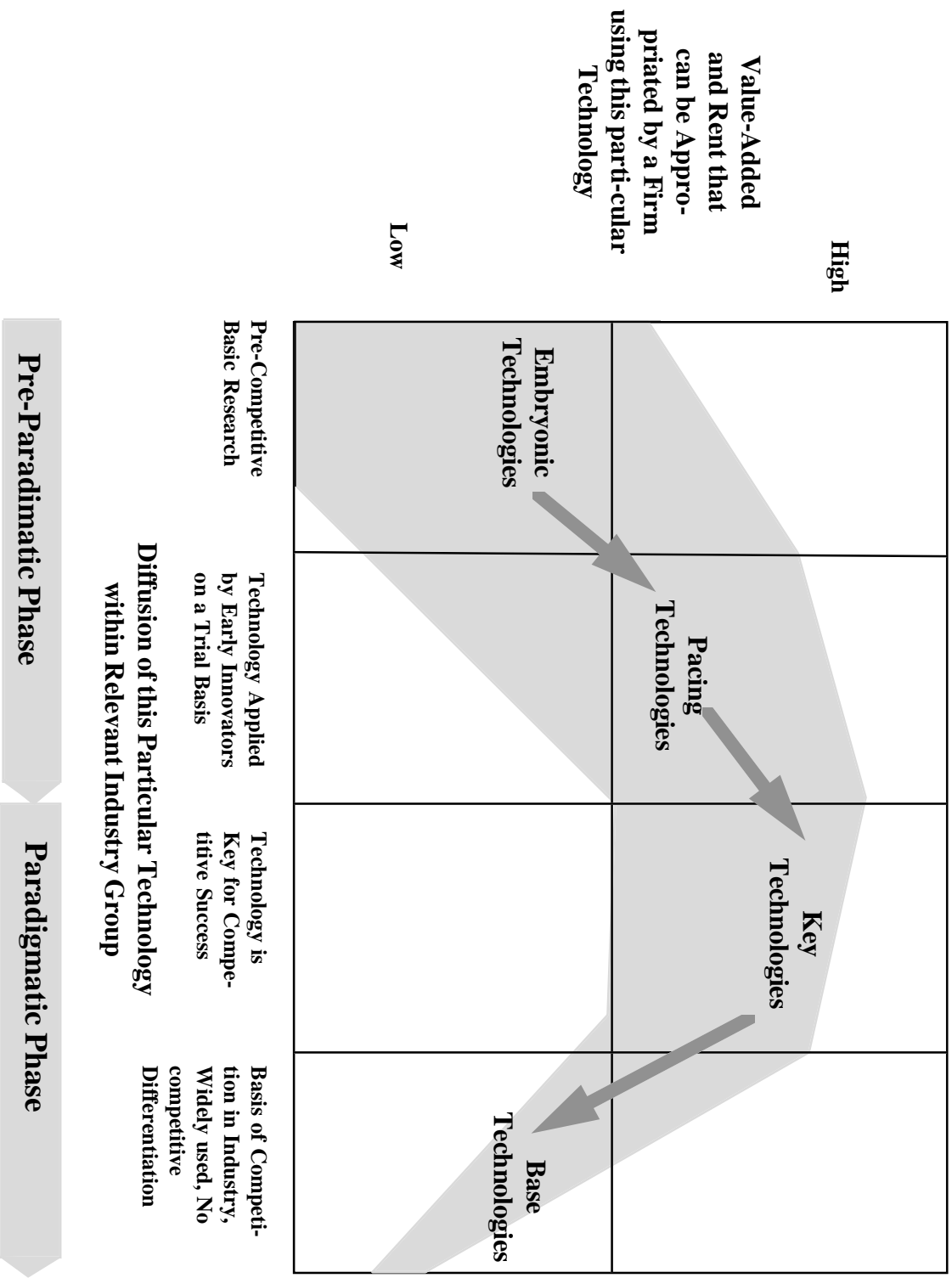
Procedure for Assessing Technological Competencies Based on Customer Requirements and Key Success Factors



Technology Unbundling and Competence Decomposition/ The Case of Automobiles and Automotive Supply



Analysis of Key, Pacing and Base Technologies



Identification of Key, Pacing and Base Technologies

Customer Requirements 1997	Technologies						
	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T _N
Key Success Factors							
KSF 1	*	**	*	****	*		
KSF 2		**		****			
KSF 3		**		****			
KSF 4		***		****			
Key Performance Characteristics							
KPC 1		*		**			
KPC 2		***	*	**			
KPC 3		**		**			
KPC 4	*	**		**			

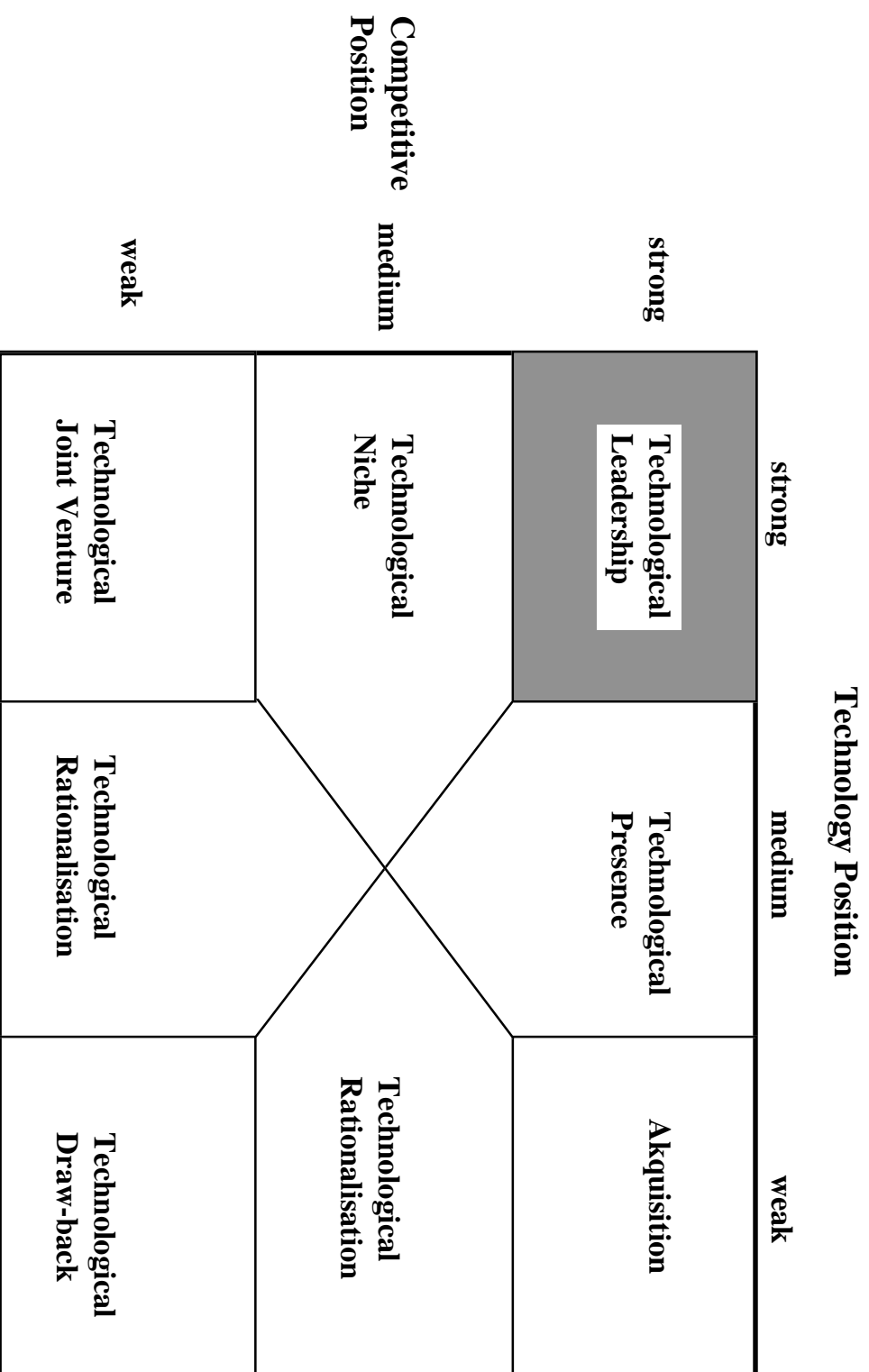
*** Very strong Impact of Technology on KSF/KPC
 ** Strong Impact
 * Some Impact

Key Technologies

Evaluation of a Firm's Technology Position and its Profile of Technological Capabilities

Technologies	Weighting Factor	Technological Capability of our Company	Technological Capabilities of Major Competitors					Relative Technology Position															
			C ₁	C ₂	C ₃	...	C _K																
Key-Technologies <ul style="list-style-type: none"> • Application Engineering • Test and Measurement • CIM • Flexible Manufacturing • Tool Technology Pacing-Technologies <ul style="list-style-type: none"> • Laser Technology • Composite Materials • Integration Wheelbearing Base Technologies <ul style="list-style-type: none"> • Integration Differential • Casting Technology • Surface Technology • Wheelbearing Technology 	(3-5)	5 4 4 2 4 4	3 4 4 2 4 4	5 4 4 3 4 4	3 3 4 2 3 3	4 3 3 2 3 3																	
								Technology Position for - Key Technologies - Pacing Technologies - Base Technologies															
																Overall Score for Technological Capabilities							

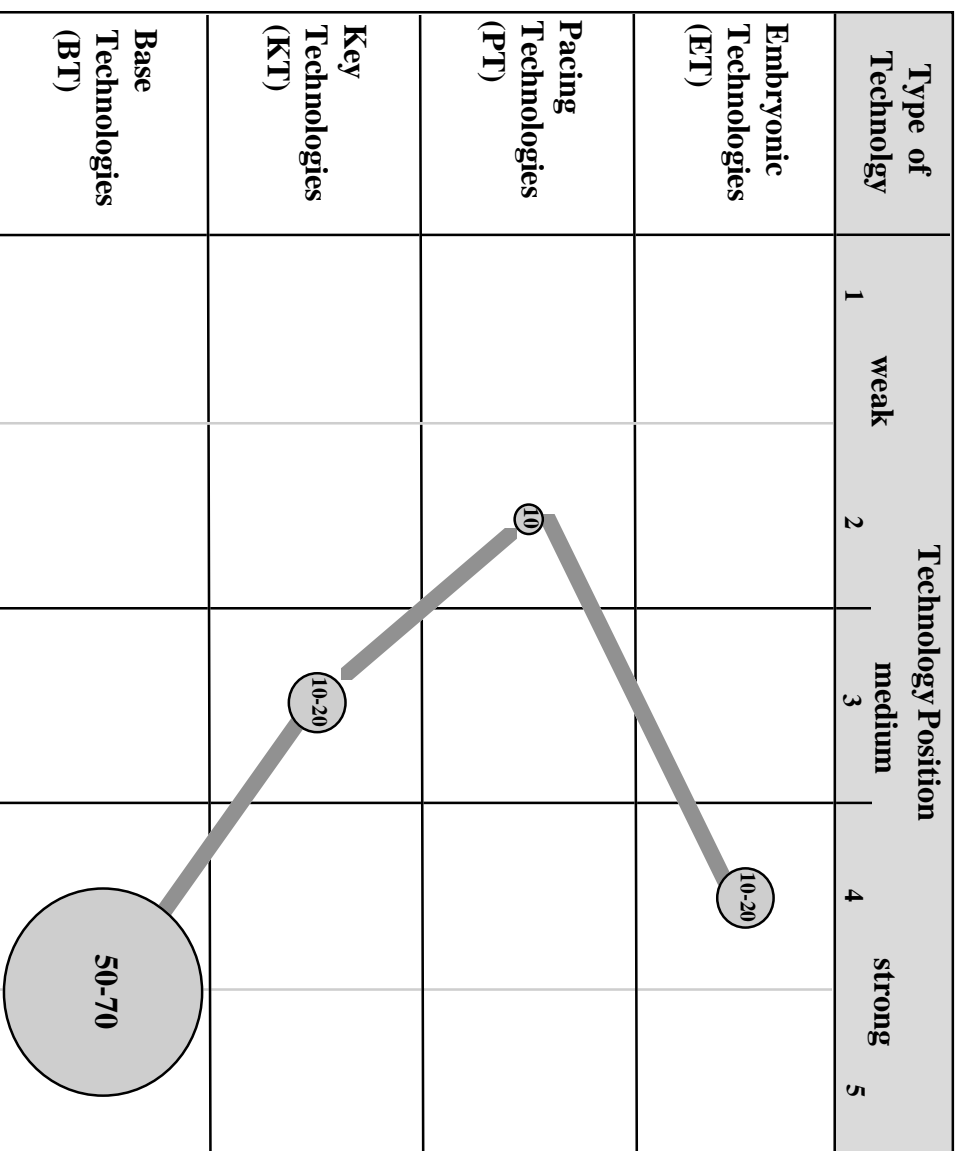
Technology Strategies must be Based on the Evaluation of a Company's Technology and Competitive Position



Technological Capabilities Differentiated by Strategic Types of Technologies

Type of Technology	Technology Position				
	1 weak	2	3 medium	4	5 strong
Embryonic Technologies (ET)		T16	T17	T18	
Pacing Technologies (PT)		T7	T8, T9	T10	
Key Technologies (KT)		T11, T6	T2, T5	T3, T4	
Base Technologies (BT)		T11		T12, T13, T15	T14

R&D Budget Breakdown in Selected Large German Corporations



30

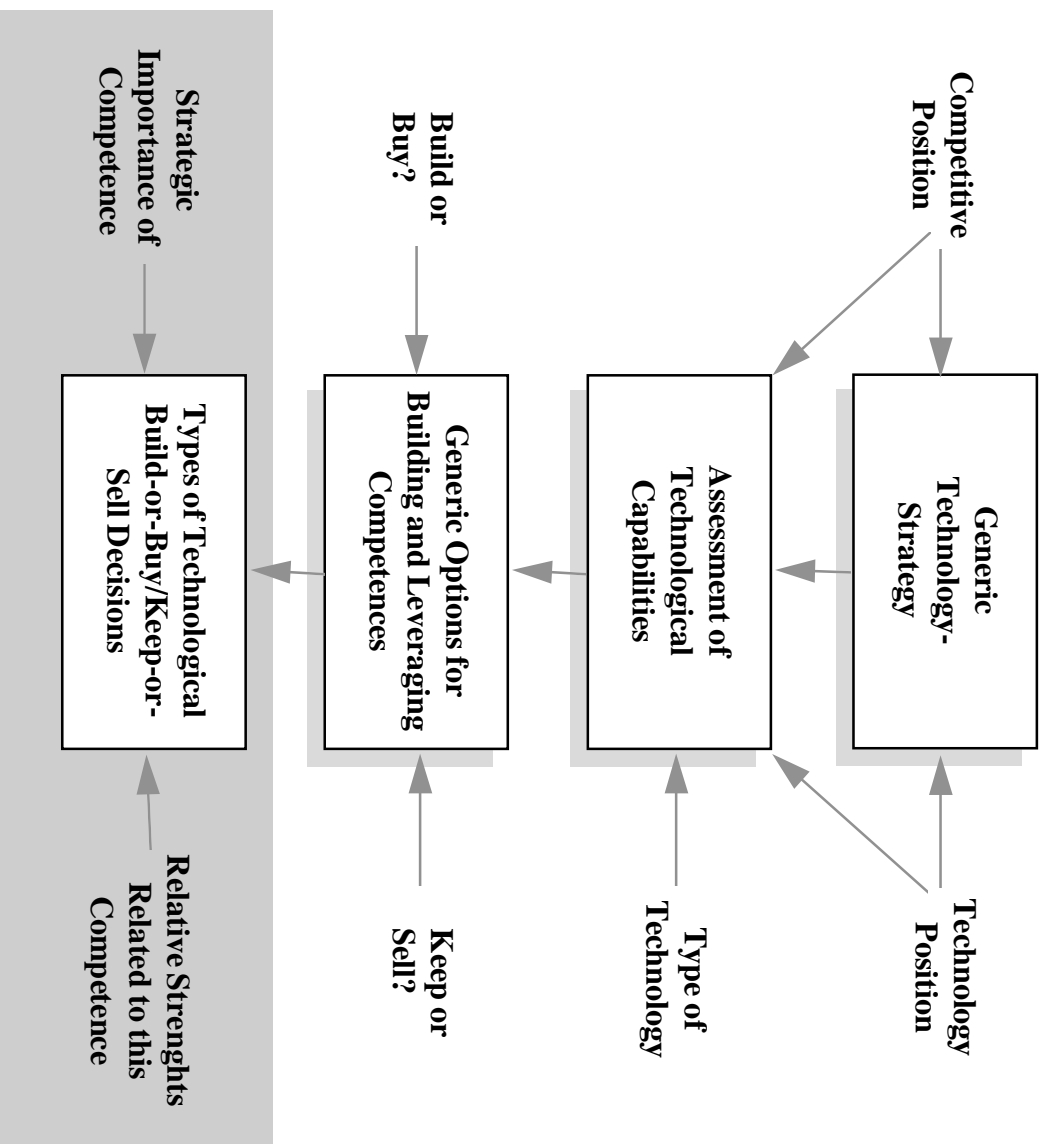
Size represents percentage of R&D Budget Allocated to this Type of Technology

Technology Leadership Strategy only Feasible for Strong and Balanced Capability Profiles

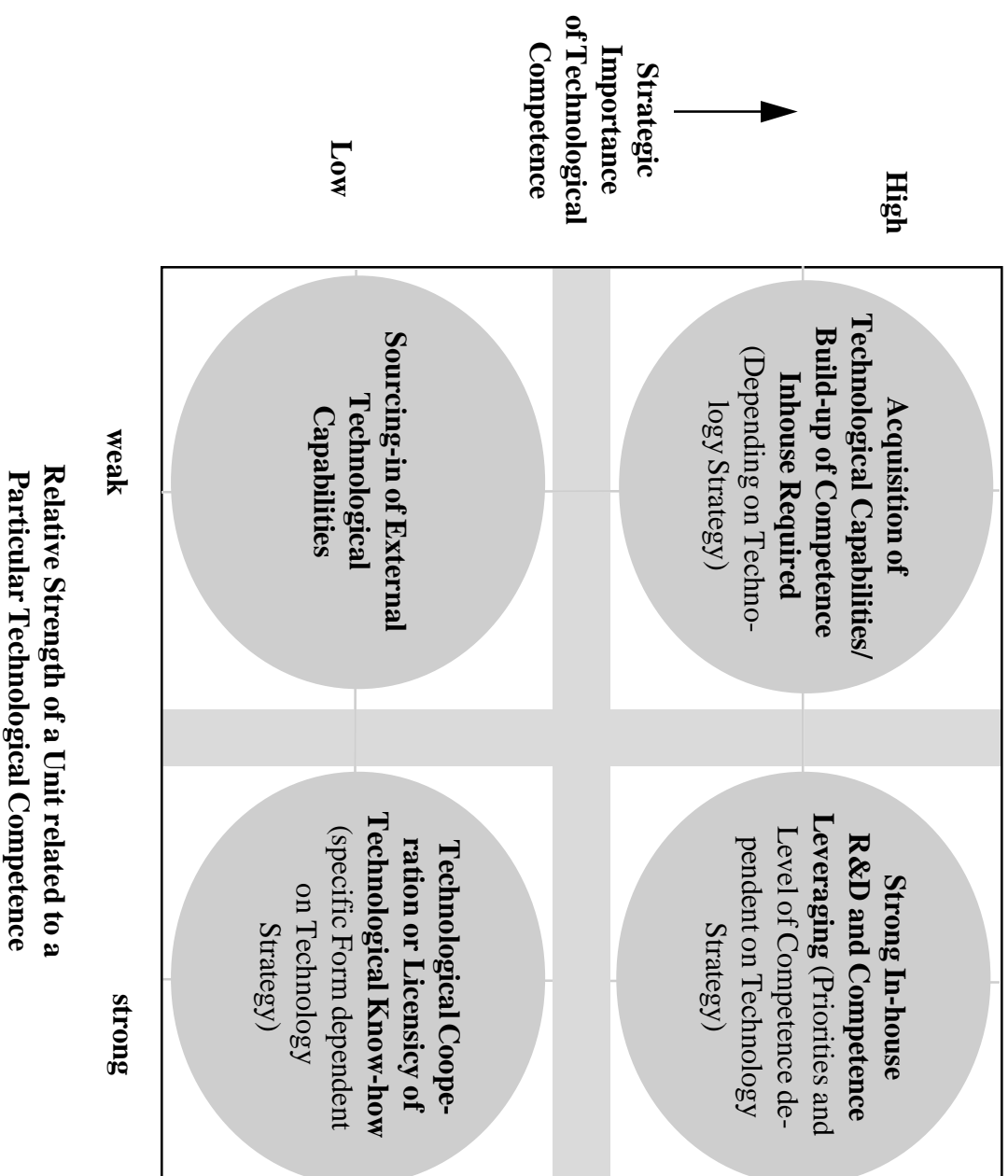
Type of Technology	Technology Position				
	1 weak	2	3 medium	4	5 strong
Embryonic Technologies (ET)			10		
Pacing Technologies (PT)			30		
Key Technologies (KT)			40		
Base Technologies (BT)			20		

Shaded area represents ideal type of competence distribution. Weaknesses (left of shaded zone) and Overshooting/"Gold-plating" (right of shaded zone) should be overcome

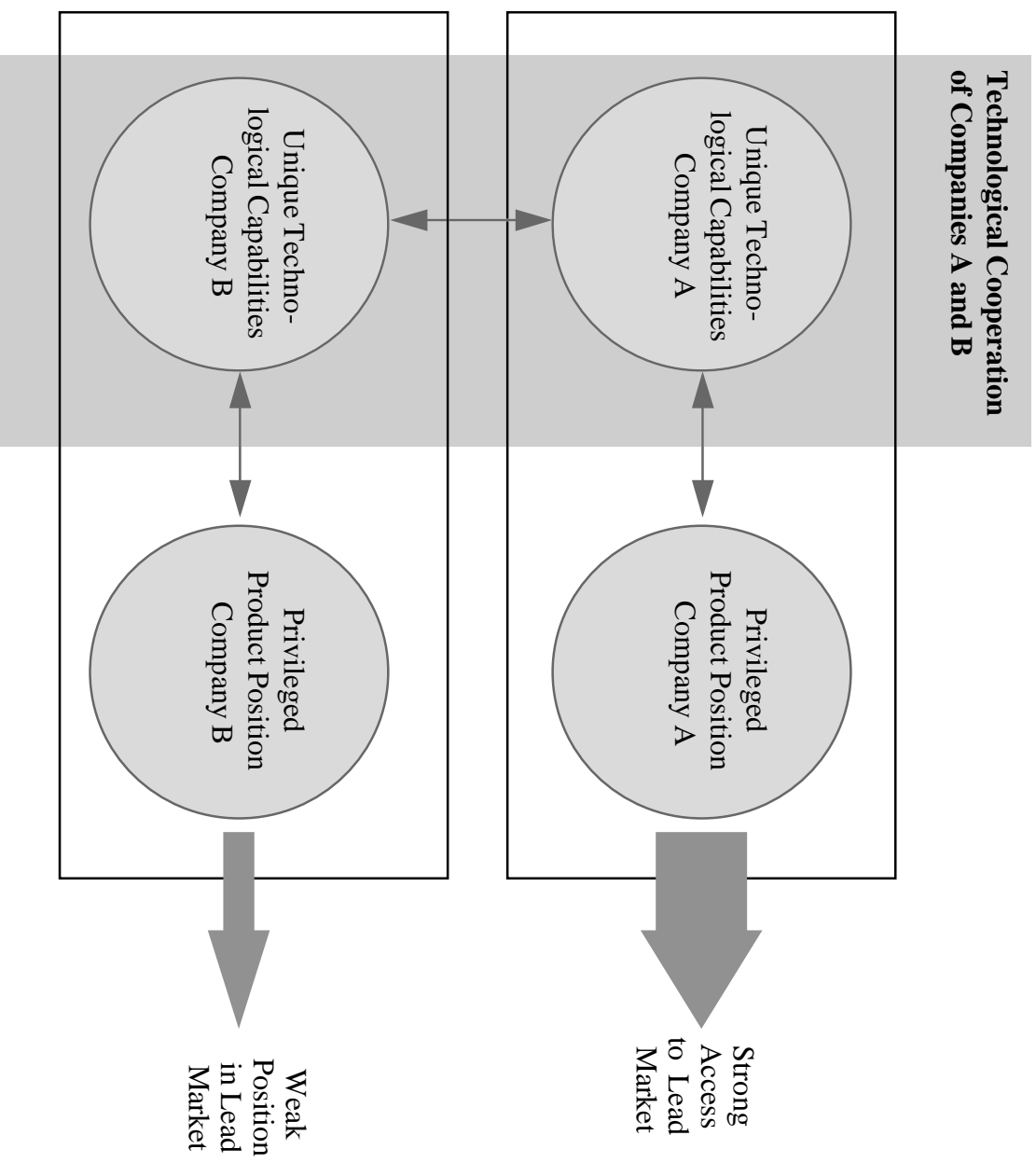
Technological Build-or-Buy and Keep-or-Sell Strategies to be Derived on Basis of Technology Strategy and Competence Profile



Generic Build-or-Buy and Keep-or-Sell-Strategies

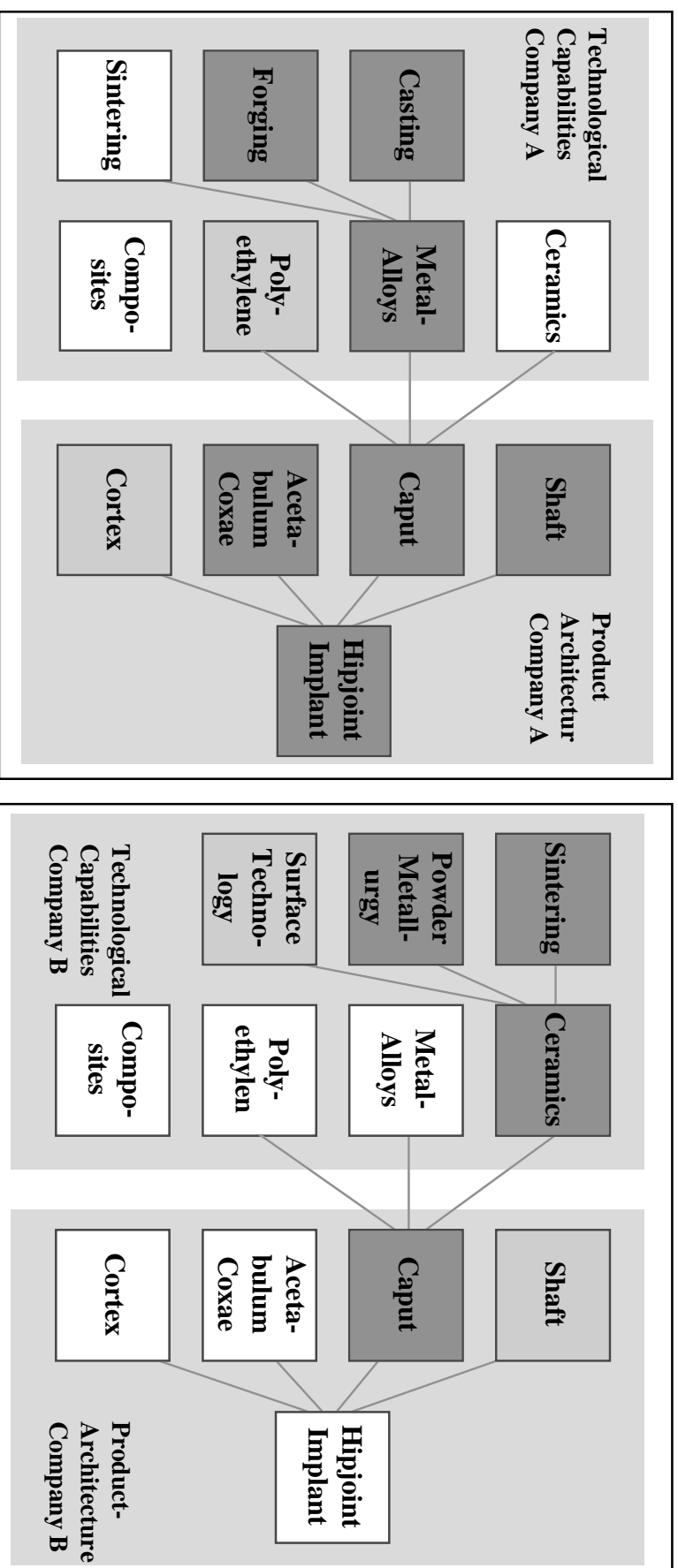


Competence Alliances and Consortia Dynamics/ The Case of Medical Implants



Technological Capabilities' Profile in Medial Implants - Partnership

Arrangement between Company A and B



Can Innovation Research and R&D Policy Learn from Technology Management within Firms?

- **Well-proven Tools have been Developed and Implemented for**
 - Profiling Technological Capabilities for Vertical Supplier-User Relationships
 - Distributed Competences within Strategic Alliances
 - Distributed Competences for Units/Locations within Firms
- **Similar Concepts can be Applied for Research Centers, Universities and Technology Policy. Problems:**
 - Reformulation of "Customer" Concept
 - Multi-Constituencies
 - No clear-cut Strategies Defined
- **Most Existing Methods for Measuring Innovation Performance are Research-Driven and Input-Oriented**
- **Critical Need Assessment and "House-of-Quality"/SMT Concepts to be Developed for "Basic Research"**

Technological Capabilities and Competence Boundaries of the Firm

