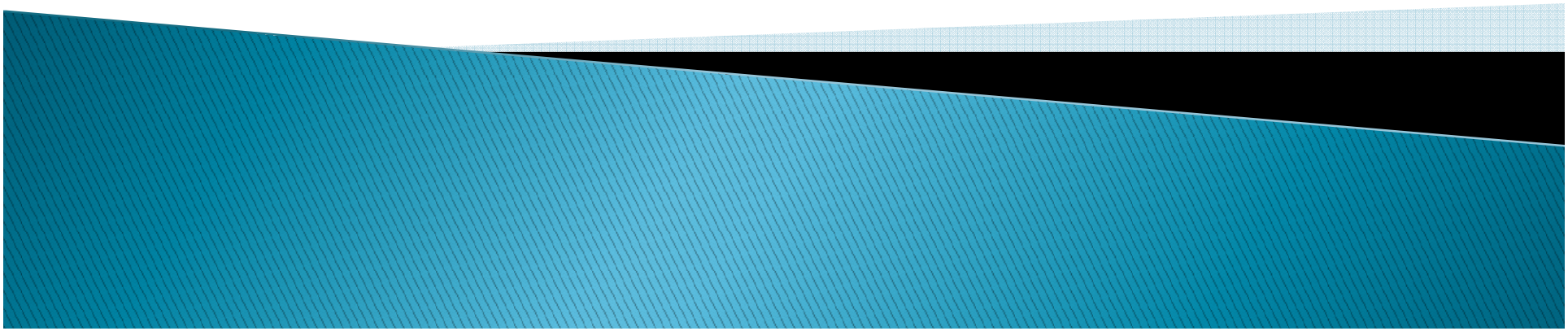
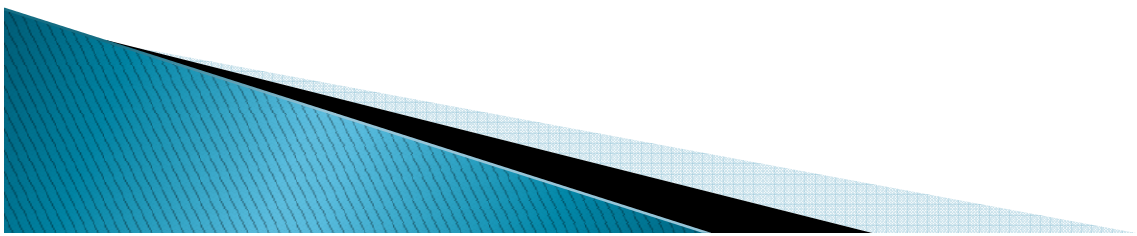
PATTERN

Planning Assistance Through Technical Evaluation of Relevance Numbers

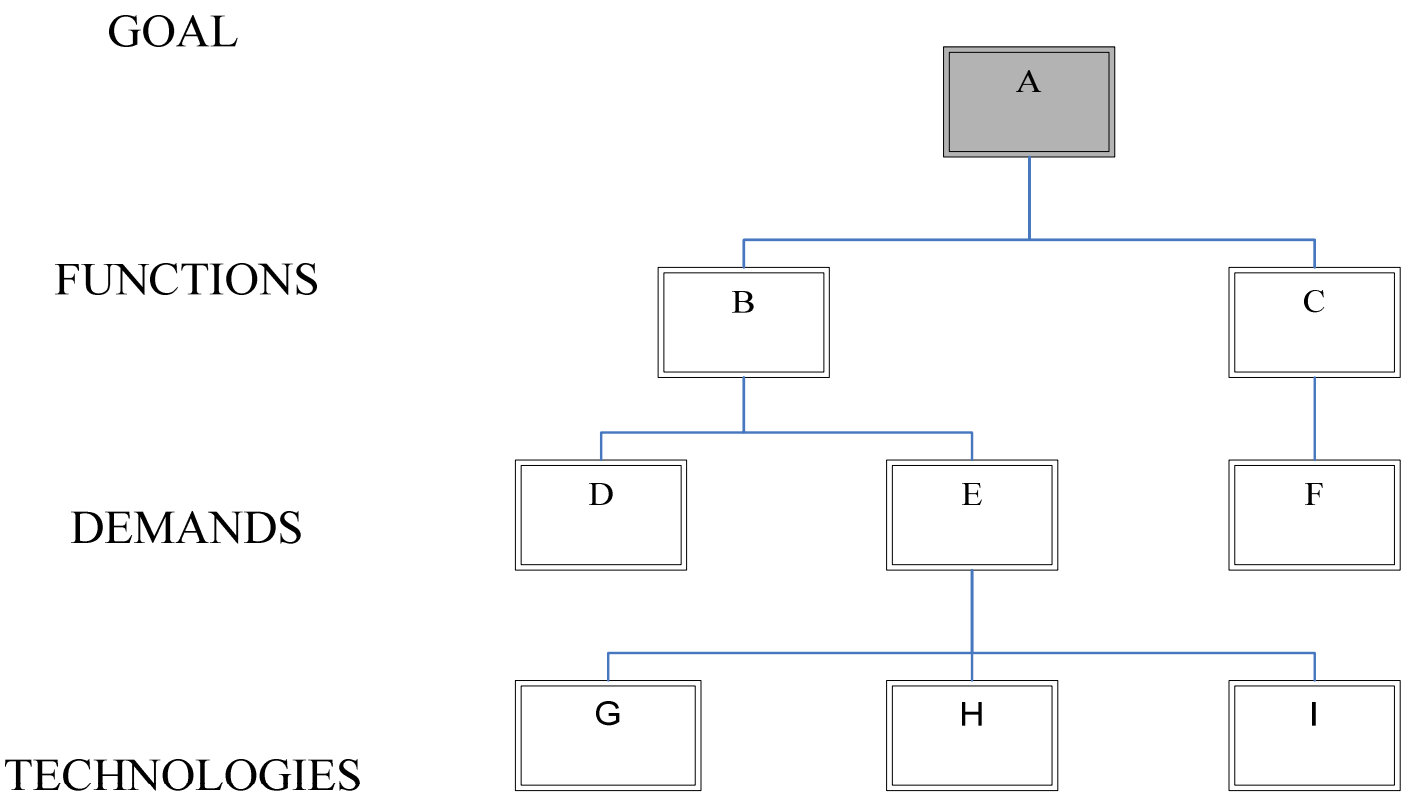


PATTERN

- Normative forecasting
- Relevance tree method
- Goal-oriented forecasting method where one establishes a future need and recedes backwards to the present and to the technologies needed to achieve the objective of the future.

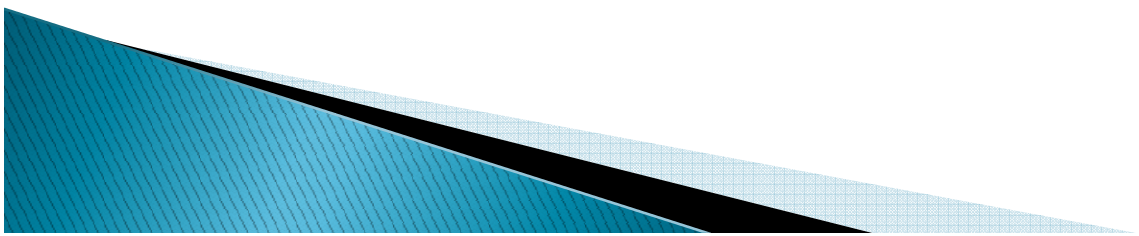


Basic form of relevance tree



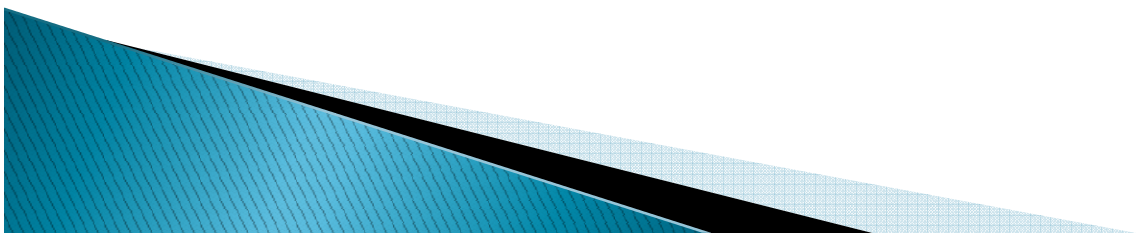
Characteristics for forming the relevance tree:

- There is hierarchy in the relevance tree
- Branches represent goals and sub-goals
- All relevant sub-goals for each goal have to be identified
- Each branch must be well defined so that there are no overlaps



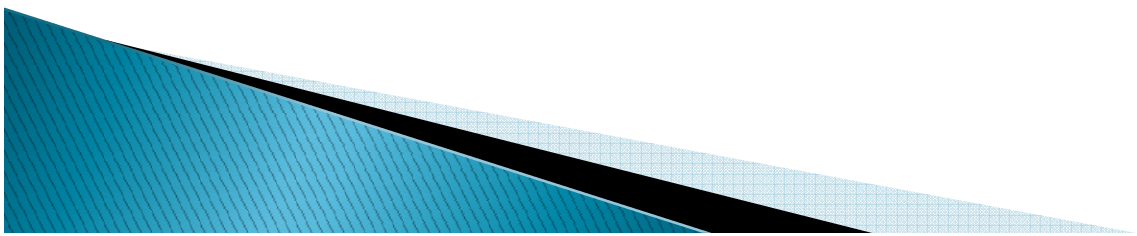
PATTERN

- PATTERN has been used by the Honeywell Corporation for military, space and medical purposes.



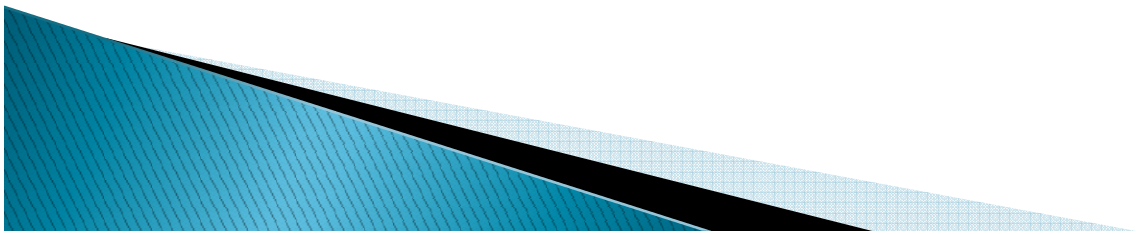
PATTERN is based on:

- Goal identification
- Recognizing the relevance of set goals in relation to criteria (means ranking, e.g. setting goals priority)
- Recognizing technological alternatives necessary for achieving the goal



Steps for PATTERN

- Model description, recognizing the goals and hierarchy of the relevance tree
- Recognize criteria
- Determine relevance numbers – with participation of experts; selected exploratory, intuitive methods can be used
- Data processing and final results – calculating relevance numbers, goals priority, ranking of technological alternatives

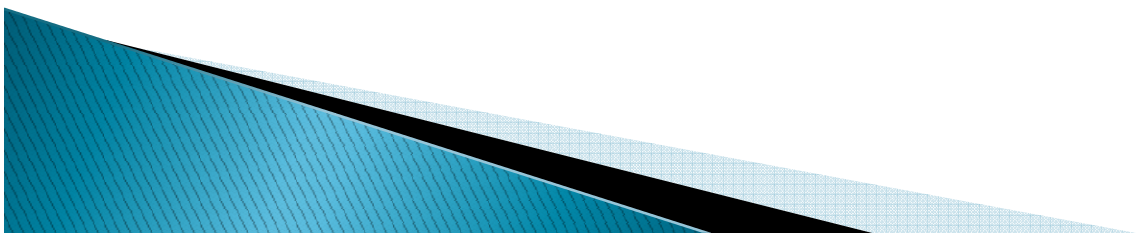


Basic terms

- Goals A, B,C…j…N
- Criteria α, β, …, x, …, *ν*.
- Levels 1, 2, 3…i…n
- Criteria weights

  $W\alpha, W\beta, \ldots, Wx, \ldots, W\nu.$
- Contribution marks of the goal j to criteria x – element weights

  $Sj\alpha, Sj\beta, \ldots, Sjx, \ldots, Sj\nu.$
- Based on the relevance tree primary matrix has to be made for each expert

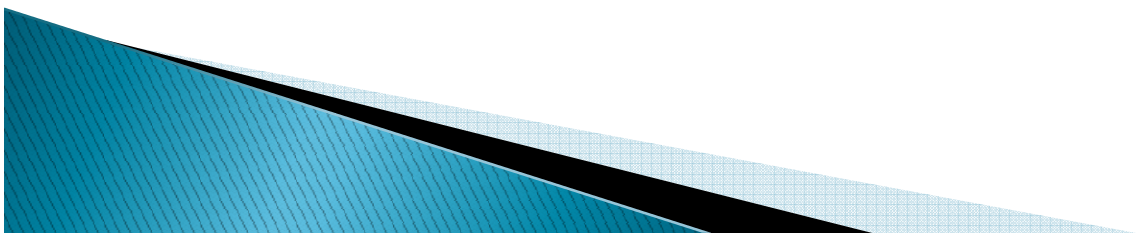


Primary matrix

Criteria	α	β	….	x	….	v
Weights	W_{α}	W_{β}	….	W_{x}	….	W_{v}
Goals	Contribution marks of goals to criteria – Element weights					
A	S_A^{α}	S_A^{β}	….	S_A^{x}	….	S_A^{v}
B	S_B^{α}	S_B^{β}	….	S_B^{x}	….	S_B^{v}
C	S_C^{α}	S_C^{β}		S_C^{x}	….	S_C^{v}
….	….	….	….	….	….	….
j	S_j^{α}	S_j^{β}	….	S_j^{x}	….	S_j^{v}
….	….	….	….	….	….	….
N	S_N^{α}	S_N^{β}	….	S_N^{x}	….	S_N^{v}

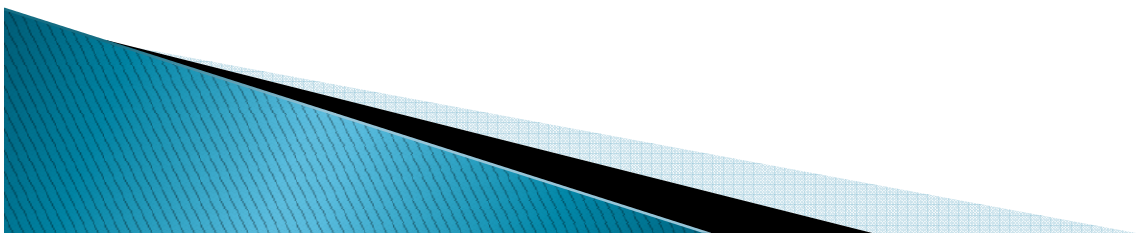
Basic terms

- Based on the primary matrix the final primary matrix has to be calculated
- The elements of final primary matrix are average values of responding elements in primary matrixes



Basic terms

- A panel of experts can be asked to weight the importance of each criterium in relation to the others
- The panel could be asked to weight the contribution of each element/goal to criteria – element weights



Conditions for primary and final primary matrix

- Sum of criteria weights is 1

$$\sum_{x=\alpha}^{v} W_x = 1$$

- Sum of contribution marks of goals to each criterium is 1

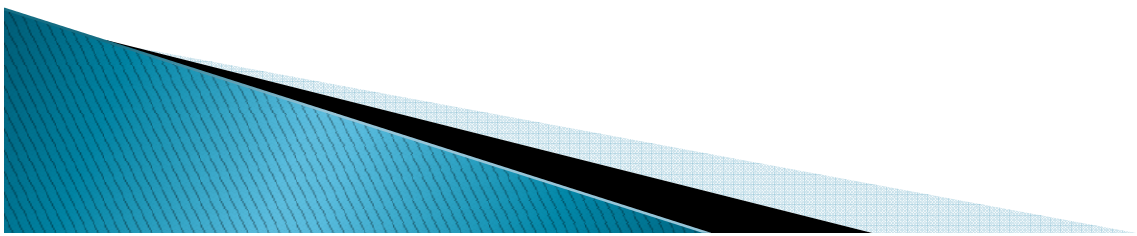
$$\sum_{j=A}^{N} S_j^x = 1$$

- Partial relevance numbers (relevance of goal j for criterium x)

$$PRN_j^x = W_x \cdot S_j^x$$

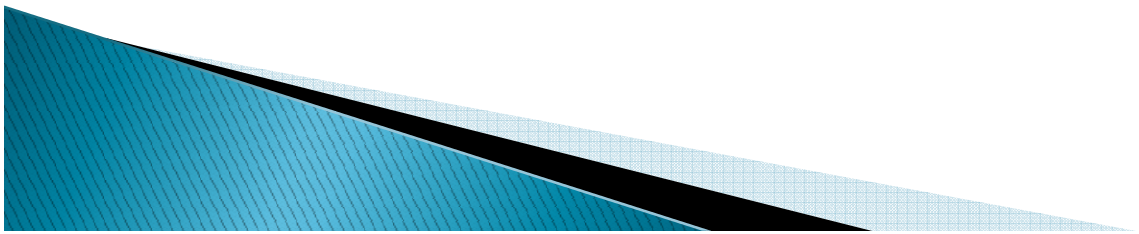
- Local relevance numbers (relevance of goal j at level i)

$$r_i^j = \sum_{x=\alpha}^{v} W_x S_j^x$$



- Condition – Sum of local relevance numbers at one level has to be 1

$$\sum_{j=A}^{N} r_i{}^{j} = 1$$



- Cumulative direct relevance number – Relevance of goal j for main goal, whole relevance tree

$$R = \prod_{i=1}^{n} r_i$$