

Packaging design - principles and evaluation

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Design - 3 basic principles

- Aesthetics
- Structure
- Functionality
- In Packaging Design the same principles are also desired



Aesthetics (Colour, Shape)



Structure (Construction, transport packaging)



Functionality (content & packaging is one)



Functionality (anti-ripuli effect liquid)



Can a package fulfill the 3 basic principles in the maximum degree?

- Aesthetics (\pm)
- Structure (\pm)
- Functionality (\pm)



So which are the criteria that we should consider & evaluate in order to create the optimum packaging solution?



So which are the criteria that we should consider & evaluate in order to create the optimum packaging solution?

Graphic Design

Constructive Design

Environmental Issues

Chemical interactions (food, beverages, medicines, cosmetics, etc)

Security

Printing Issues

Marketing

Branding strategy

Energy consumption

Consumer needs

Logistics

Cost – Price



So which are the criteria that we should consider & evaluate in order to create the optimum packaging solution?

Materials Used

Construction Strength

Visual Communication

Consumers' Psychology

Safety

Special applications

Legislation

Printing Issues

Color Reproduction

Labeling

etc ...



But do we have to consider all these matters when we are about to design a new packaging or re-design an older one?



But do we have to consider all these matters when we are about to design a new packaging or re-design an older one?

YES, even it seems so complicated...



Is there a way to organize all this information in order to manage it?

Multicriteria Analysis techniques:

- Transportation
- Agricultural issues
- Crisis management
- Sport management



There are plenty Multicriteria Analysis techniques:

- Linear evaluation of each criterion (mean calculations)
- Multi dimensional evaluation (geometrical calculations)
- Same weighting factor for every criterion
- Different weighting factors for each criterion
- One/two/three stages analysis processes



A simple Multicriteria Analysis for Packaging Design

- 6 basic Criteria Determination
(Design, Marketing, Materials, Environment, Logistics & Cost)
- Legislation (7th criterion) is treated as an umbrella criterion (co-estimated with every other criterion)
- Two stages procedure (sub-criteria and final evaluation)



A simple Multicriteria Analysis for Packaging Design

Two stages procedure (sub-criteria and final evaluation)

Stage 1:

- Determination of the Different weighting factors for each sub-criterion
- Estimation of the values for each sub-criterion
- Evaluation of the value for each Criterion



A simple Multicriteria Analysis for Packaging Design

Two stages procedure (sub-criteria and final evaluation)

Stage 2:

- Determination of the Different weighting factors for each Criterion
- The values for each Criterion are estimated in Stage 1
- Evaluation of each Packaging Solution



Lets see it working



Existing packaging - New packaging



Stage 1: Determination of the Different weighting factors for each sub-criterion

		Alternative Packaging Performance					
Criterion	Sub-criterion	Existing packaging	New packaging	Ideal solution	Very good	Sufficient	Non acceptable limit
1st Criterion Design	Visual Communication			8			
	Graphic Design			12			
	Constructive Design			8			
	Technical Printing Issues			8			
	Technical Construction Issues			8			
	Legislation			6			
	1st Criterion Performance			50			



Stage 1: Determination of the Different weighting factors for each sub-criterion

		Alternative Packaging Performance					
Criterion	Sub-criterion	Existing packaging	New packaging	Ideal solution	Very good	Sufficient	Non acceptable limit
1st Criterion Design	Visual Communication			8			5
	Graphic Design			12			6
	Constructive Design			8			5
	Technical Printing Issues			8			5
	Technical Construction Issues			8			5
	Legislation			6			3
	1st Criterion Performance			50			29



Stage 1: Determination of the Different weighting factors for each sub-criterion

		Alternative Packaging Performance					
Criterion	Sub-criterion	Existing packaging	New packaging	Ideal solution	Very good	Sufficient	Non acceptable limit
1st Criterion Design	Visual Communication			8	7	6	5
	Graphic Design			12	10	8	6
	Constructive Design			8	7	6	5
	Technical Printing Issues			8	7	6	5
	Technical Construction Issues			8	7	6	5
	Legislation			6	5	4	3
	1st Criterion Performance			50	43	36	29



Stage 1: Estimation of the values for each sub-criterion

		Alternative Packaging Performance					
Criterion	Sub-criterion	Existing packaging	New packaging	Ideal solution	Very good	Sufficient	Non acceptable limit
1st Criterion Design	Visual Communication	6	7	8	7	6	5
	Graphic Design	10	11	12	10	8	6
	Constructive Design	7	7	8	7	6	5
	Technical Printing Issues	7	7	8	7	6	5
	Technical Construction Issues	7	7	8	7	6	5
	Legislation	6	6	6	5	4	3
	1st Criterion Performance				43	36	29



Stage 1: Evaluation (calculation of the value) of the first Criterion

		Alternative Packaging Performance					
Criterion	Sub-criterion	Existing packaging	New packaging	Ideal solution	Very good	Sufficient	Non acceptable limit
1st Criterion Design	Visual Communication	6	7	8	7	6	5
	Graphic Design	10	11	12	10	8	6
	Constructive Design	7	7	8	7	6	5
	Technical Printing Issues	7	7	8	7	6	5
	Technical Construction Issues	7	7	8	7	6	5
	Legislation	6	6	6	5	4	3
	1st Criterion Performance	43 (0,86)	45 (0,90)	50 (1,0)	43	36	29



Stage 1: Evaluation (calculation of the value) of the second Criterion

		Alternative Packaging Performance					
Criterion	Sub-criterion	Existing packaging	New packaging	Ideal solution	Very good	Sufficient	Non acceptable limit
2nd Criterion Marketing - Branding	Visual Communication	5	6	7	6	5	4
	Consumers psychology	9	10	11	10	8	6
	Marketing research	6	6	7	6	5	4
	Branding Strategy	6	7	7	6	5	4
	Competition - Innovation	6	6	7	6	5	4
	Economical Issues	5	5	6	5	4	3
	Legislation	5	5	5	5	4	3
	2nd Criterion Performance	42 (0,84)	45 (0,90)	50 (1,0)	44	36	28



Stage 1: Evaluation (calculation of the value) of the third Criterion

		Alternative Packaging Performance					
Criterion	Sub-criterion	Existing packaging	New packaging	Ideal solution	Very good	Sufficient	Non acceptable limit
3rd Criterion Materials - Construction	Physicochemical properties	7	7	8	7	6	5
	Printability	10	10	12	10	8	6
	Formability	7	7	8	7	6	5
	Construction energy requirements	7	7	8	7	6	5
	Environment	7	7	8	7	6	5
	Legislation	6	6	6	5	4	3
	3rd Criterion Performance	44 (0,88)	44 (0,88)	50 (1,0)	43	36	29



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Stage 1: Evaluation (calculation of the value) of the fourth Criterion

		Alternative Packaging Performance					
Criterion	Sub-criterion	Existing packaging	New packaging	Ideal solution	Very good	Sufficient	Non acceptable limit
4th Criterion Logistics	Labeling	6	6	7	6	5	4
	Protection and Safety	9	9	10	9	8	6
	Secondary – tertiary packaging	6	7	7	6	5	4
	Innovative technologies	6	6	7	6	5	4
	Energy & Transportation Costs	6	6	7	6	5	4
	Batches recalls	6	6	7	6	5	4
	Legislation	6	6	5	5	4	3
	4th Criterion Performance	45 (0,90)	46 (0,92)	50 (1,0)	44	37	29



Stage 1: Evaluation (calculation of the value) of the fifth Criterion

		Alternative Packaging Performance					
Criterion	Sub-criterion	Existing packaging	New packaging	Ideal solution	Very good	Sufficient	Non acceptable limit
5th Criterion Environment	Production pollutants	7	7	8	7	6	5
	Transportation pollutants	10	11	12	10	8	6
	Packaging pollutants	7	7	8	7	6	5
	Recyclability or Degradability potential	7	7	8	7	6	5
	Waste handling	7	7	8	7	6	5
	Legislation	6	6	6	5	4	3
	5th Criterion Performance	44 (0,88)	45 (0,90)	50 (1,0)	43	36	29



Stage 1: Evaluation (calculation of the value) of the sixth Criterion

		Alternative Packaging Performance					
Criterion	Sub-criterion	Existing packaging	New packaging	Ideal solution	Very good	Sufficient	Non acceptable limit
6th Criterion Cost	Production Cost	6	6	7	6	5	4
	Filling Cost	8	9	10	10	8	6
	Transportation Cost	6	6	7	6	5	4
	Recall & Defective Cost	6	6	7	6	5	4
	Packaging Cost vs Product Price	6	6	7	6	5	4
	Advertisement Cost	5	5	6	5	4	3
	Waste handling Cost	6	6	6	5	4	3
	6th Criterion Performance	43 (0,86)	44 (0,88)	50 (1,0)	44	36	28



Stage 2: Determination of the Different weighting factors for each Criterion

	Criterion 1 Design	Criterion 2 Marketing	Criterion 3 Materials	Criterion 4 Logistics	Criterion 5 Environment	Criterion 6 Cost	
	α_1	α_2	α_3	α_4	α_5	α_6	
Weighting Factor	20%	20%	15%	15%	15%	15%	
	β_1	β_2	β_3	β_4	β_5	β_6	PPI
Existing packaging Criterion Value							
New packaging Criterion Value							

Stage 2: The values for each Criterion are estimated in Stage 1

	Criterion 1 Design	Criterion 2 Marketing	Criterion 3 Materials	Criterion 4 Logistics	Criterion 5 Environment	Criterion 6 Cost	
	α_1	α_2	α_3	α_4	α_5	α_6	
Weighting Factor	20%	20%	15%	15%	15%	15%	
	β_1	β_2	β_3	β_4	β_5	β_6	PPI
Existing packaging Criterion Value	0,86	0,84	0,88	0,90	0,88	0,86	
New packaging Criterion Value	0,90	0,90	0,88	0,92	0,90	0,88	



Stage 2: Evaluation of each Packaging Solution –

Packaging Performance Index (PPI) is estimated with the use of equation:

$$PPI = \frac{\alpha_1\beta_1 + \alpha_2\beta_2 + \alpha_3\beta_3 + \alpha_4\beta_4 + \alpha_5\beta_5 + \alpha_6\beta_6}{\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 + \alpha_5 + \alpha_6}$$

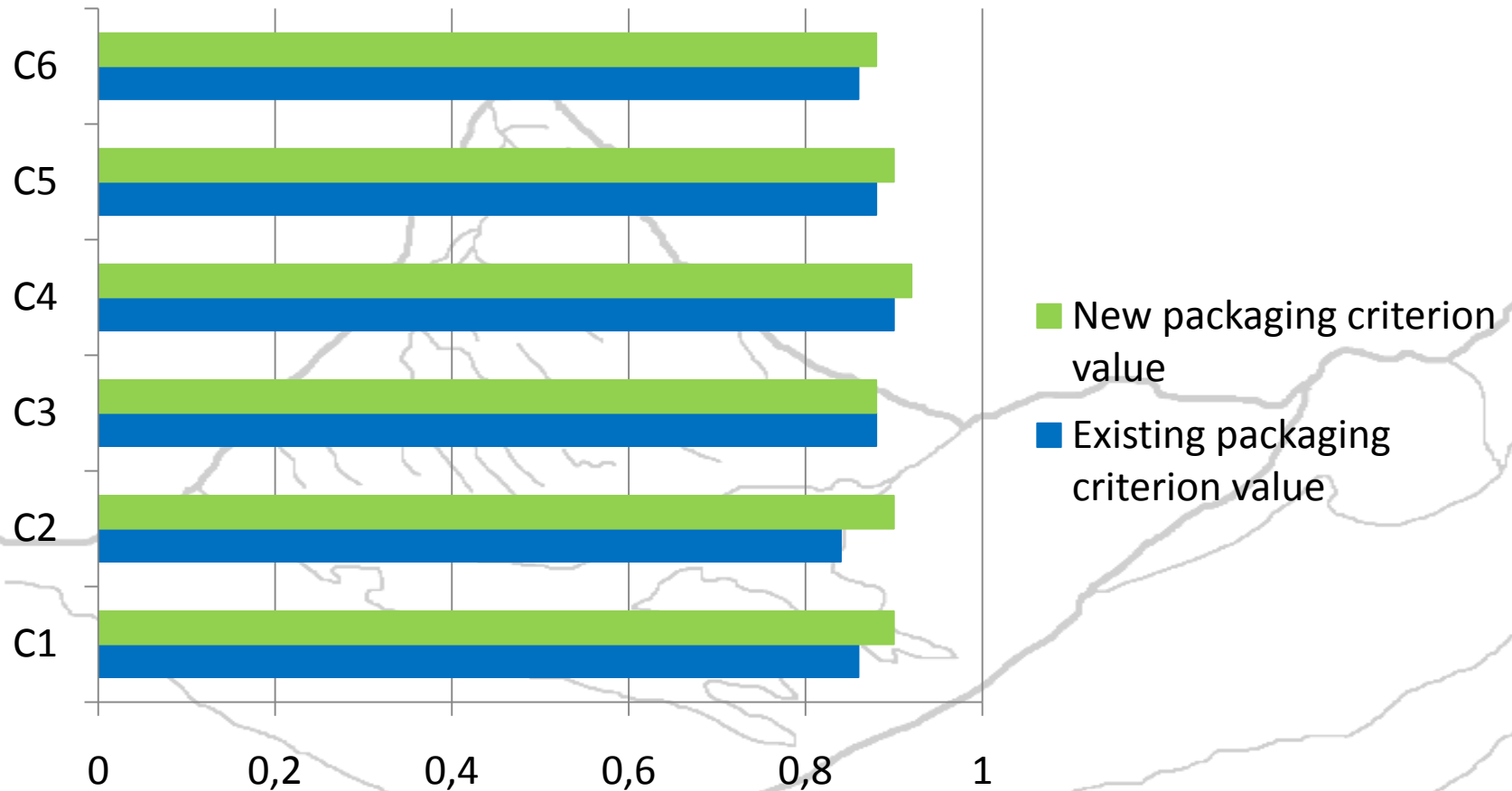


Stage 2: Evaluation of each Packaging Solution – Packaging Performance Index

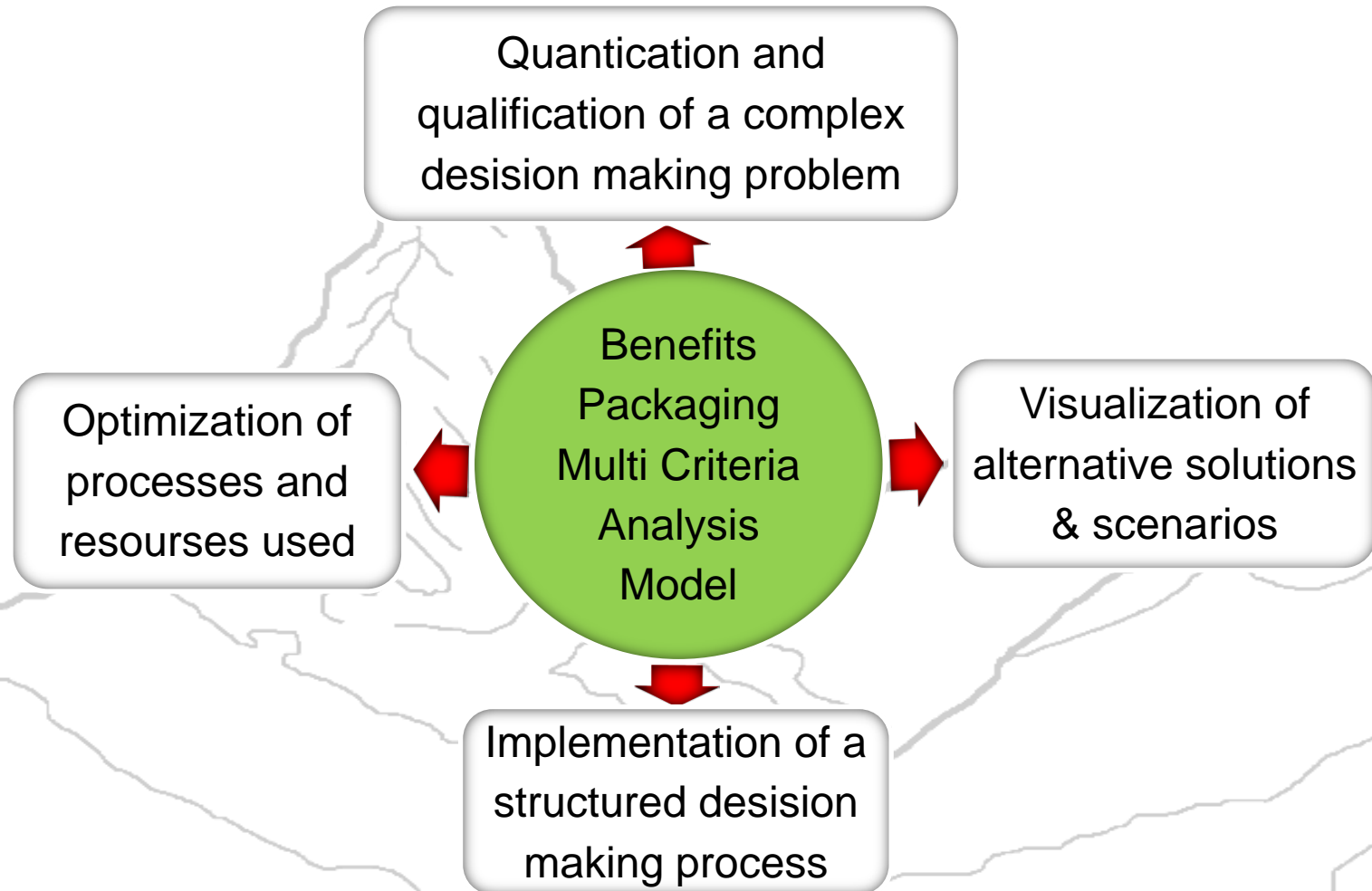
	Criterion 1 Design	Criterion 2 Marketing	Criterion 3 Materials	Criterion 4 Logistics	Criterion 5 Environment	Criterion 6 Cost	
	α_1	α_2	α_3	α_4	α_5	α_6	
Weighting Factor	20%	20%	15%	15%	15%	15%	
	β_1	β_2	β_3	β_4	β_5	β_6	PPI
Existing packaging Criterion Value	0,86	0,84	0,88	0,90	0,88	0,86	0,868 or 86,8%
New packaging Criterion Value	0,90	0,90	0,88	0,92	0,90	0,88	0,897 or 89,7%



Stage 2: Evaluation of each Packaging Solution – Visualization



Benefits of the Multicriteria Analysis in Packaging Design



Assignment: lets evaluate Packaging

- 6 working groups (3-4 persons in each group)
- Each group has to evaluate 3 packages under a specific Criterion
- Each group has one leader that proposes the weighting factor of the Criterion that his/her group is studying after discussion with his/her group
- The group of the 6 leaders make the final evaluation of the packaging
- The other members of the each group support their leaders to present their work



Assignment: lets evaluate Packaging

Time limitations:

- 30 min for discussing the weighting factors within each group, to collect data and make the evaluation of each criterion
- 20 min for the leaders to discuss and determine the weighting factors for each criterion, to make the final evaluation and calculate the Packaging Performance Indexes
- 10 min for the groups to make the final Presentation.
- 15 min to present the results of your assignment.



Assignment: lets evaluate Packaging

Working Groups:

➤ Group 1 – **Design**,

Leader: **Sara** Team: Silvio, Nella

➤ Group 2 – **Marketing**

Leader: **Valentina**, Team: Andreas (Coffe), Jonnas , Aggeliki

➤ Group 3 – **Materials**

Leader: **Victor**, Team: Florian, Havva, Sakis

➤ Group 4 – **Logistics**,

Leader: **Niko**, Team: Katharina, Yianni, Xristos

➤ Group 5 – **Environment**

Leader: **Olga**, Team: Sofie, Irene

➤ Group 6 – **Cost**

Leader: **Maria**, Team: Hanna, Makis, Yiannis Sel



Assignment: lets evaluate Packaging



1st Packaging

2nd Packaging

3rd Packaging



Assignment: lets evaluate Packaging - Stage 1 Table

		Alternative Packaging Performance						
Criterion	Sub-criterion	Packaging 1	Packaging 2	Packaging 3	Ideal solution	Very good	Sufficient	Non axeptable limit
Criterion								
	Criterion Performance							



Assignment: lets evaluate Packaging

Stage 2 table

$$PPI = \frac{\alpha_1\beta_1 + \alpha_2\beta_2 + \alpha_3\beta_3 + \alpha_4\beta_4 + \alpha_5\beta_5 + \alpha_6\beta_6}{\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 + \alpha_5 + \alpha_6}$$

	Criterion 1 Design	Criterion 2 Marketing	Criterion 3 Materials	Criterion 4 Logistics	Criterion 5 Environment	Criterion 6 Cost	
	α_1	α_2	α_3	α_4	α_5	α_6	
Weighting Factor							
	β_1	β_2	β_3	β_4	β_5	β_6	PPI
Existing packaging Criterion Value							
New packaging Criterion Value							

