



UNIVERSITY OF PITTSBURGH

JOSEPH M. KATZ GRADUATE SCHOOL OF BUSINESS

BQOM-2521:DECISION MAKING IN A COMPLEX ENVIRONMENT

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FINAL PROJECT:

SHOULD BRAZIL LEGALIZE MARIJUANA?

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EXECUTIVE SUMMARY

Currently, there is a lot of discussion related to whether drugs should be legalized or not. Marijuana is the most consumed illegal drug worldwide and it is not regarded as a heavy drug in terms of its effects. Countries like the Netherlands, Portugal, Uruguay and several states of the US have legalized the consumption of marijuana. Several countries are starting to discuss the impact of the legalization of marijuana, including Brazil. In this project, we developed a BOCR model to help decide whether Brazil should legalize marijuana or not, based on the characteristics and the needs of the country, considering the following aspects: social accord, economic development, public well-being and the public opinion. The results obtained showed that the legalization of marijuana is beneficial to Brazil considering long term aspects, but it is not advised in the short term, mainly due to the fact that 80% of the population of the country is against the legalization of this drug.

1. Introduction:

Marijuana is the most consumed illegal drug in the world and it is not considered a heavy drug with regard to its effects. This drug was already legalized in the Netherlands, Portugal and Uruguay and in several states of the US. A large number of countries is currently discussing the benefits and the impacts of the legalization of marijuana, including Brazil (Miranda, 2015).

2. Brazil in context:

It is estimated that Brazil has approximately 2,744,712 marijuana users (approximately 1.33% of the country population). (Teixeira, 2016)

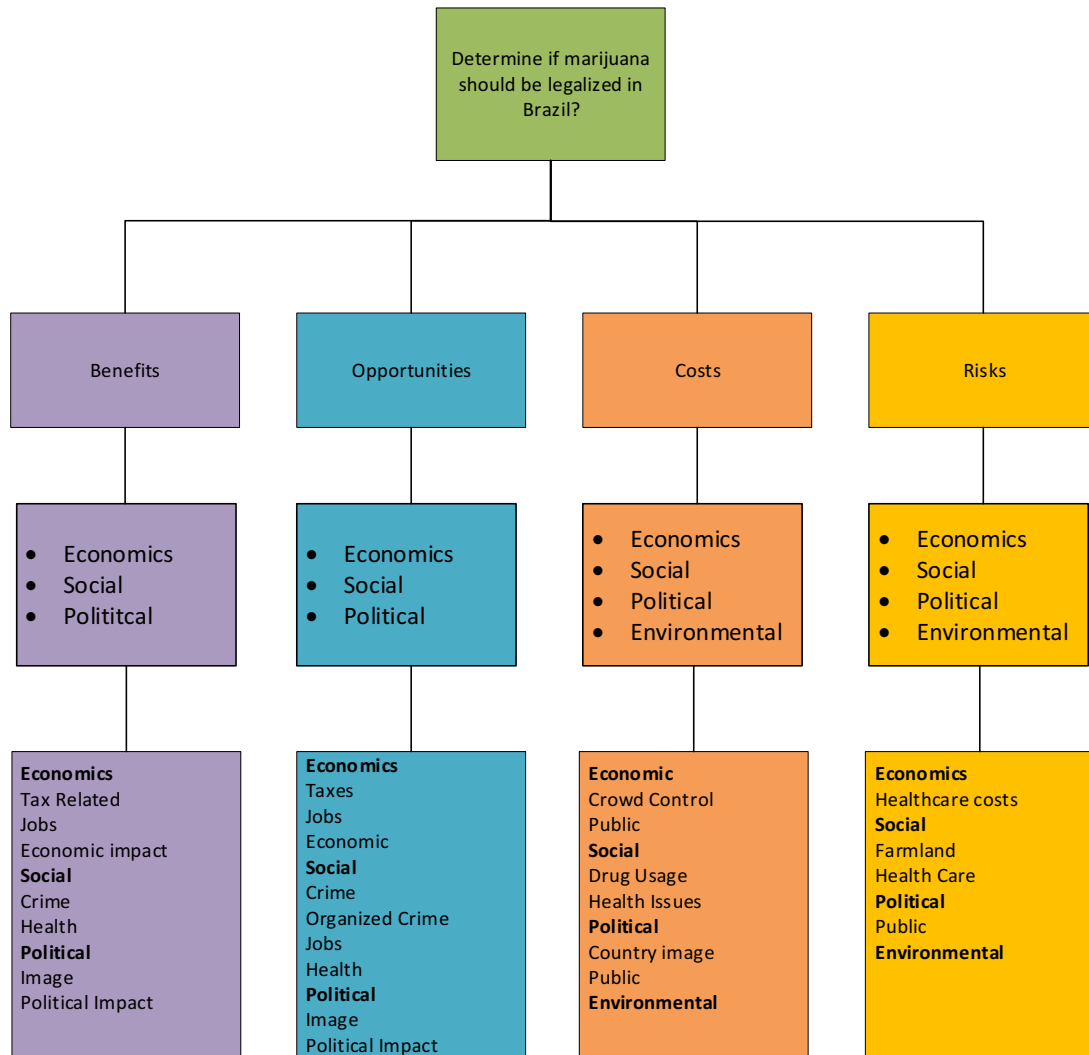
The prohibition of the drug has not prevented its consumption from increasing and, more importantly, the “war on drugs” policy has contributed to the increase in violence, police corruption and prison overcrowding in the country. Around 28% of the prison population in Brazil was arrested for drug dealing and the vast majority of the people marijuana traffickers are young men with no other criminal records. (Miranda, 2015)

Marijuana represents a very important source of funding criminal organizations in Brazil. It is by far the most lucrative drug sold in the favelas of Rio de Janeiro (around 1500% of profit margin) and the sales volume of marijuana represent circa 40% of the total amount of all drugs sold. It is estimated that the total sales revenue obtained from the commercialization of marijuana is R\$ 5.69 billion (or US\$ 1.78 billion). (Teixeira, 2016)

Even though legalization of marijuana is being discussed, a survey that was conducted in 2014 showed the 80% of Brazil’s population is against the legalization of the drug. (Miranda, 2015).

3. BOCR Model lay-out:

The BOCR model developed to analyze whether or not marijuana should be legalized in Brazil is the following:



This problem will be analyzed from the point of view of policy makers and the government, but the opinion of the country's population about this topic was also taken into consideration.

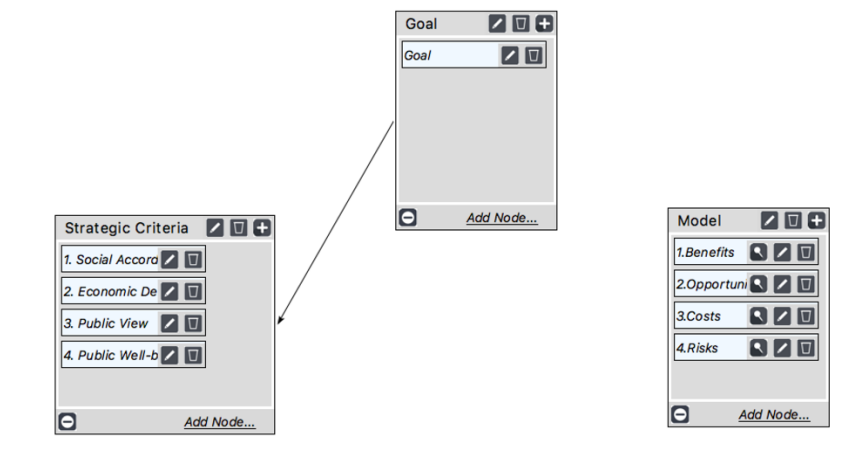
The strategic criteria utilized in this decision were the following:

1. Social Accord;
2. Economic Development;
3. Public Well-being;
4. Public View

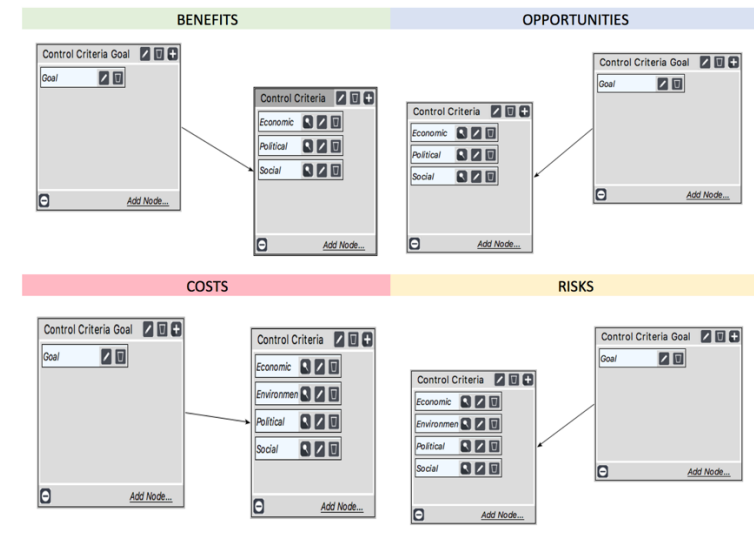
1. Social Accord		0.48463	0.484632
2. Economic Development		0.13545	0.135448
3. Public View		0.10471	0.104712
4. Public Well-being		0.27521	0.275208

The model implemented on the software **Superdecisions** is the following:

- Main network layout:

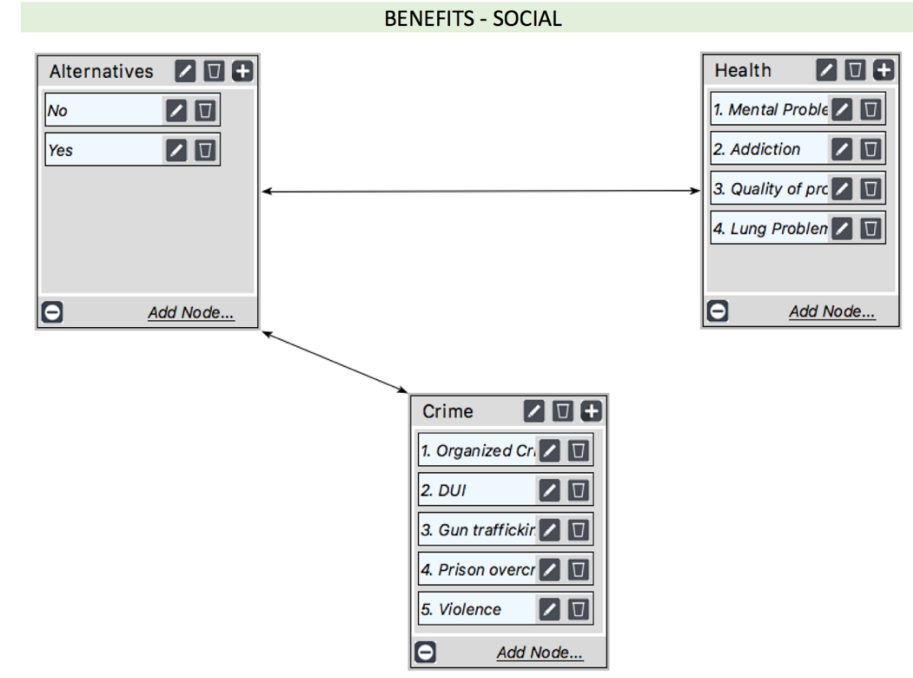


- Control Criteria Networks:

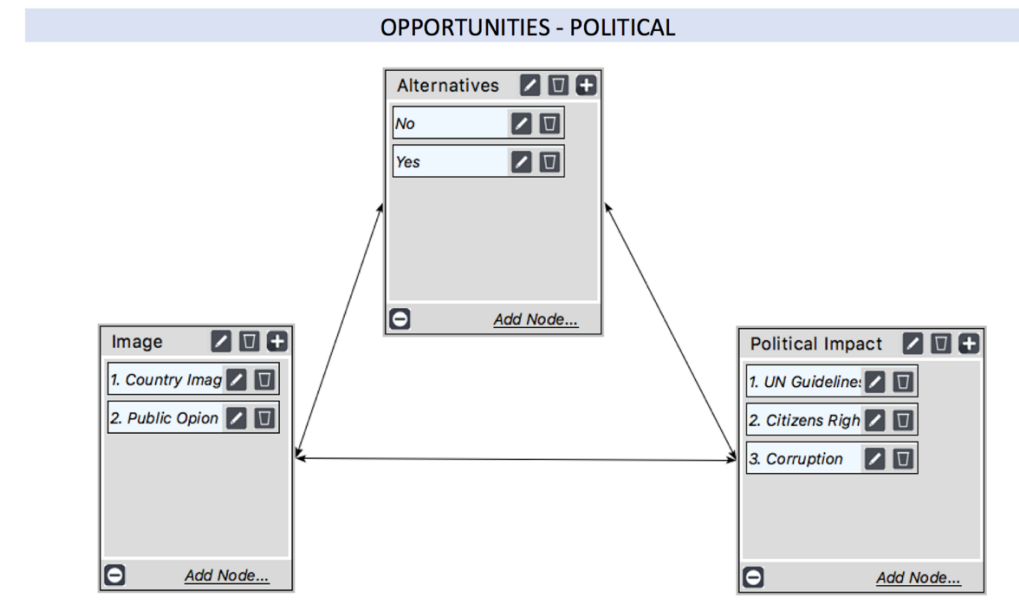


An example of a subnetwork for each of the control criteria is illustrated below:

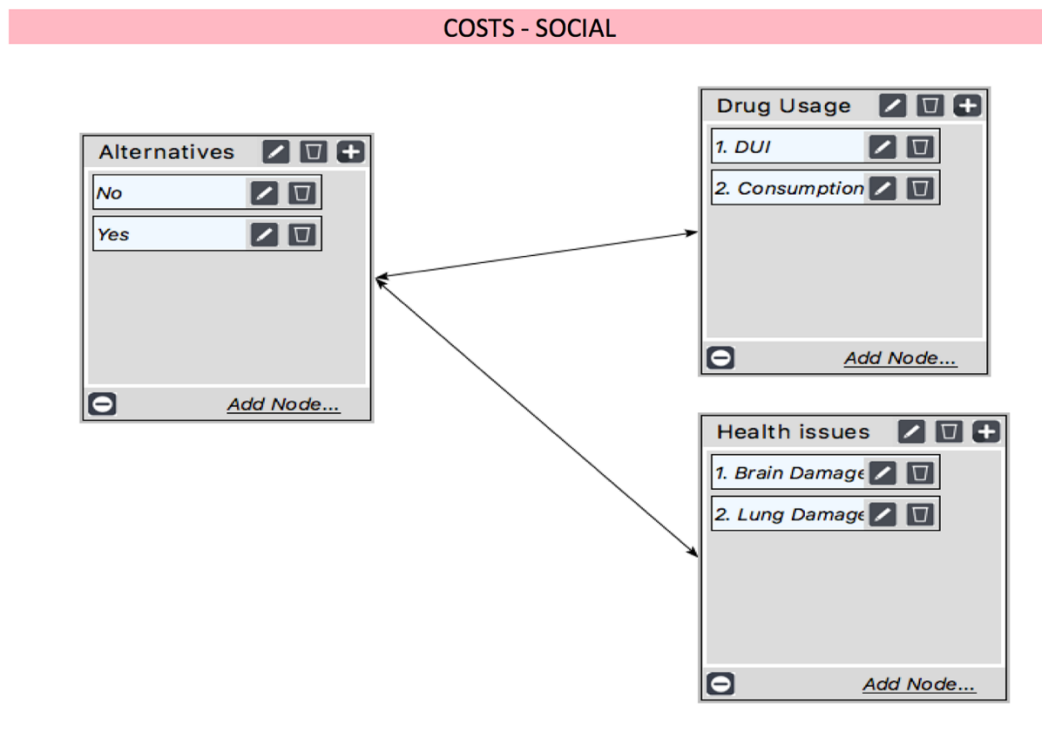
- Benefits – Social:



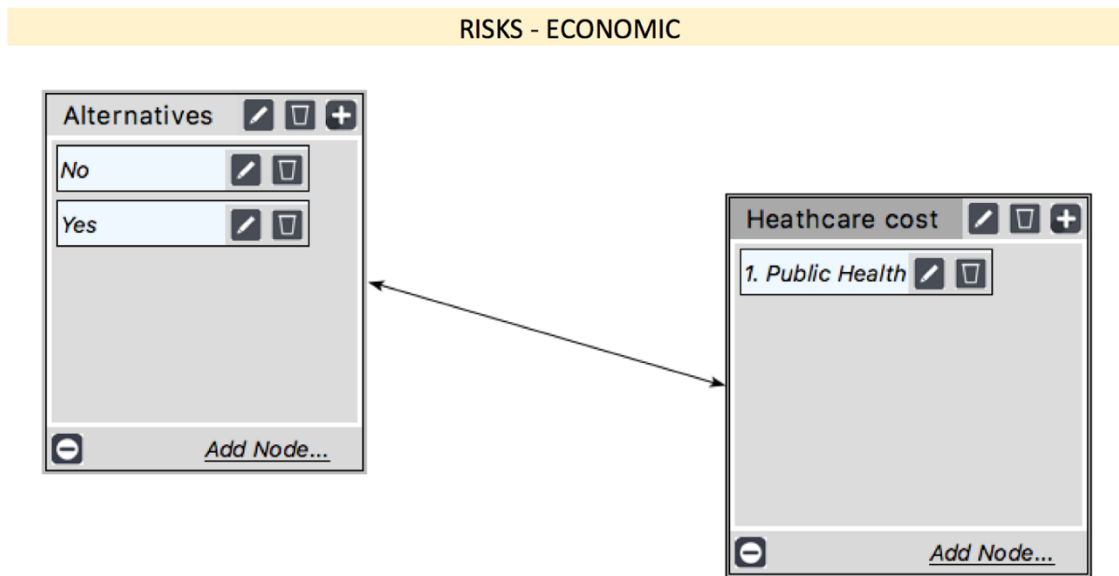
- Opportunities – Political:



- Costs – Social:



- Risks – Economic:



The consequences of legalizing (or not legalizing) marijuana in Brazil were assessed through pairwise comparisons, as the following figure illustrates:

Comparisons wrt "No" node in "Crime" cluster																									
2. DUI is moderately more important than 1. Organized Crime																									
1.	1. Organized~	>=9.5	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	>=9.5	No comp.	2.	DUI		
2.	1. Organized~	>=9.5	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	>=9.5	No comp.	3.	Gun traff~		
3.	1. Organized~	>=9.5	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	>=9.5	No comp.	4.	Prison ov~		
4.	1. Organized~	>=9.5	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	>=9.5	No comp.	5.	Violence		
5.	2. DUI	>=9.5	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	>=9.5	No comp.	3.	Gun traff~		
6.	2. DUI	>=9.5	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	>=9.5	No comp.	4.	Prison ov~		
7.	2. DUI	>=9.5	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	>=9.5	No comp.	5.	Violence		
8.	3. Gun traff~	>=9.5	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	>=9.5	No comp.	4.	Prison ov~		
9.	3. Gun traff~	>=9.5	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	>=9.5	No comp.	5.	Violence		
10.	4. Prison ov~	>=9.5	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	>=9.5	No comp.	5.	Violence		

For the strategic criteria, a ratings model was developed, as the following figures show:

Step 1: Select criteria for rating alternatives

Double click criterion to add it

+

Current Model

Currently chosen ratings criteria:

1. Social Accord

2. Economic Developm

3. Public View

4. Public Well-being

Select criteria to remove:

New alternative name: Current alternatives

1.Benefits

2.Opportunities

3.Costs

4.Risks

Create Alternative

Copy Alternatives

Paste Alternatives

Select alternatives to delete

Delete Alternative(s)

1. Social Accord		ScaleItem	Value	Graphic	Delete
2. Economic Developm		Exceclent	1.0000	<div></div>	<div></div>
3. Public View		Fair	0.5000	<div></div>	<div></div>
4. Public Well-being		Poor	0.2500	<div></div>	<div></div>
		Dreadful	0.1000	<div></div>	<div></div>
		Good	0.7500	<div></div>	<div></div>

Alternatives	Priorities	Totals	1. Social Accord (0.4846)	2. Economic D... (0.1354)	3. Public View (0.1047)	4. Public Well-... (0.2752)
1.Benefits	0.2769	0.5353	Good	Satisfactory	Unfavorable	Average
2.Opportunities	0.2948	0.5700	Good	Great	Neutral	Below Average
3.Costs	0.2287	0.4421	Fair	Satisfactory	Neutral	Average
4.Risks	0.1997	0.3860	Fair	Insufficient	Neutral	Average

4. Results obtained:

After synthesizing the model, the following results were obtained:

Strategic Criteria - Ratings		
Name	Normalized By Cluster	Limiting
1. Social Accord	0.48463	0.484632
2. Economic Development	0.13545	0.135448
3. Public View	0.10471	0.104712
4. Public Well-being	0.27521	0.275208

1.Benefits - Priorities		
Name	Normalized By Cluster	Limiting
Economic	0.52784	0.527836
Political	0.13965	0.139648
Social	0.33252	0.332516

2. Opportunities - Priorities		
Name	Normalized By Cluster	Limiting
Economic	0.6267	0.626696
Political	0.09362	0.093616
Social	0.27969	0.279688

3. Costs - Priorities		
Name	Normalized By Cluster	Limiting
Economic	0.49624	0.496238
Environmental	0.15006	0.150061
Political	0.10558	0.105582
Social	0.24812	0.248119

4. Risks - Priorities		
Name	Normalized By Cluster	Limiting
Economic	0.13807	0.138071
Environmental	0.27614	0.276142
Political	0.19526	0.195262
Social	0.39052	0.390524

Overall Synthesized Priorities - Benefits	
No	0.404454
Yes	0.595546

Overall Synthesized Priorities - Opportunities	
No	0.323786
Yes	0.676214

Overall Synthesized Priorities - Costs	
No	0.28753
Yes	0.71247

Overall Synthesized Priorities - Risks	
No	0.381329
Yes	0.618671

The overall results obtained for the short term and the long term are the following:

- **Short term (BO/CR model):**

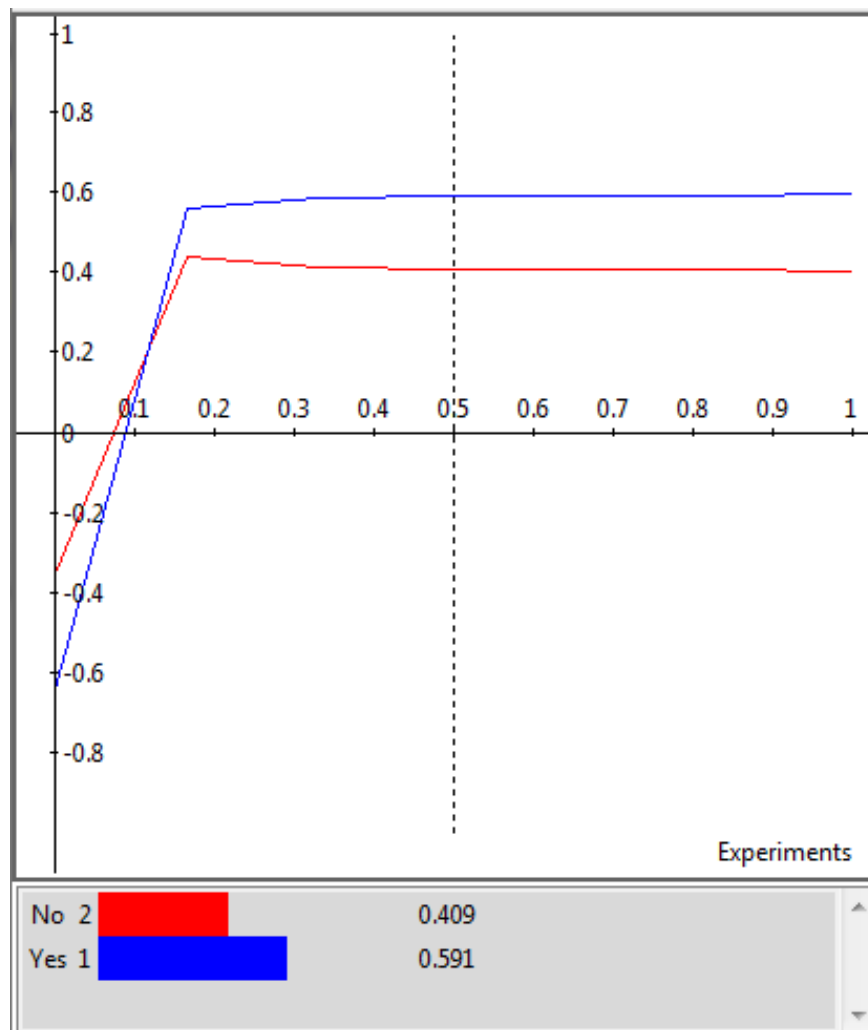
Overall Synthesized Priorities - Main Network (short term)	
No	0.566591
Yes	0.433409

- Long term (bB + oO – cC – rR model):

Overall Synthesized Priorities - Main Network (long term)	
No	0.454147
Yes	0.545853

5. Sensitivity analysis:

We carried out a sensitivity analysis for the Additive Model and the results obtained show that the decision of legalizing marijuana in the long term is robust, since this decision is maintained throughout almost the entire range for the sensitivity parameter. Similar results were also obtained for the other categories of the problem: Opportunities, Costs and Risks.



6. Conclusion:

The decision for the short and long term aspects of our problem were different. The reason for it is the fact that the opinion of Brazilian citizens had a significant weight in our decision model. As it was mentioned before in this report, the vast majority of Brazil's population would disapprove the legalization of marijuana.

However, we believe the most significant effects of the population disapproval will be temporary. For this reason, this aspect was weighted higher in the short term aspects (cost and benefits).

We believe that the arguments for legalizing marijuana are strong but we weren't sure if the public opinion would push it out. Therefore, we strongly recommend that this discussion be fostered among Brazilian citizens. This theme is still a taboo for many Brazilians, and providing objective evidence that the legalization of this drug is an effective way of tackling the resistance of the population.

7. References:

[1] Saaty, T. *Why the US should legalize marijuana*. University of Pittsburgh, 2015.

[2] Miranda, F. *Legalização e regulamentação maconha: um breve estudo da importância desse debate para o Brasil*. Instituto Legislativo Brasileiro, Senado Federal, 2015.

[3] Teixeira, L. *Impacto Econômico da Legalização das Drogas no Brasil*. Câmara dos Deputados, Consultoria Legislativa, Agosto, 2016.