Decision Making in Complex Environment

BQOM 2521

Assignment 2
Market Share Exercise

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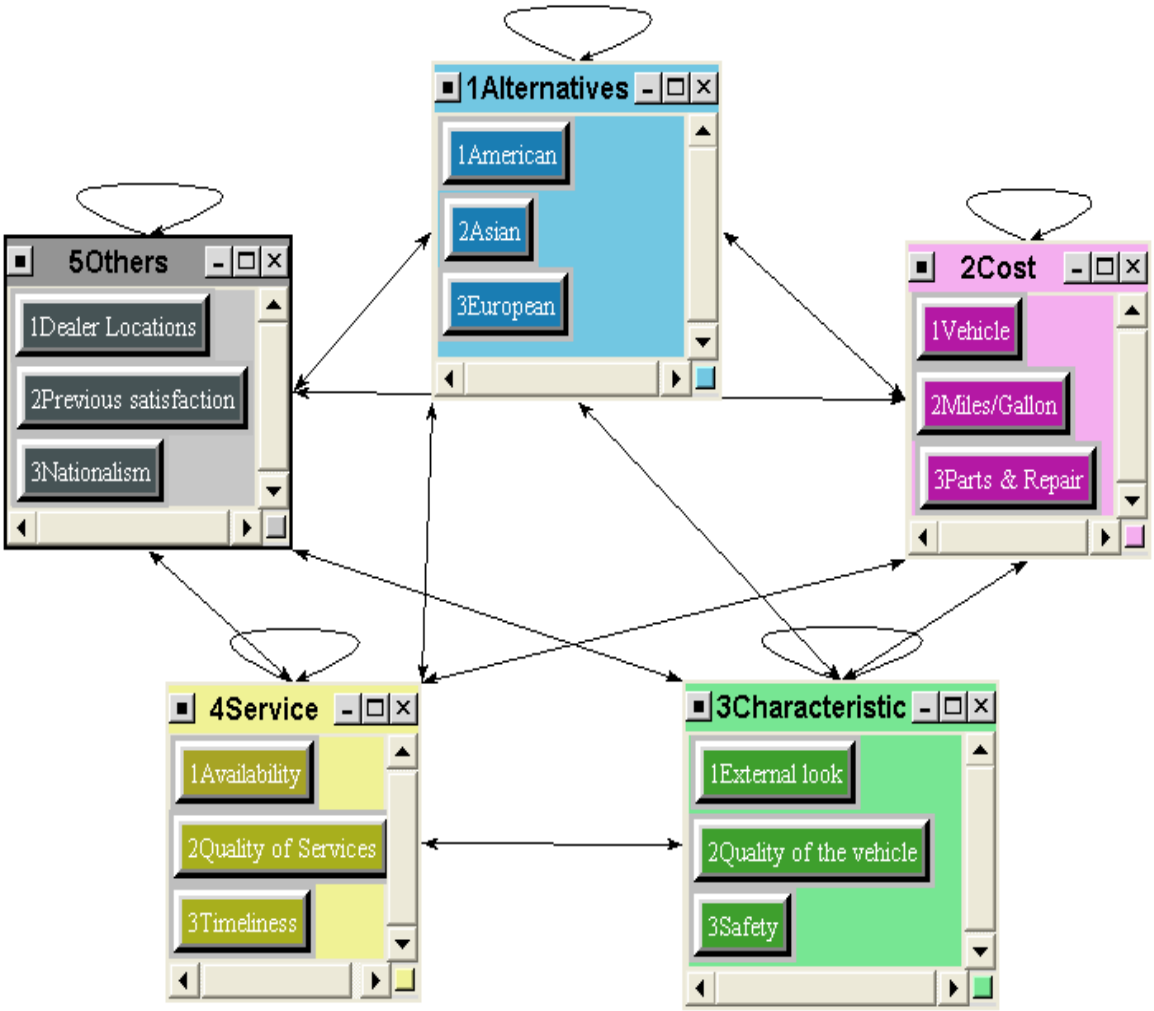
Date: ***3/12/2002***

Passenger Car Market

Model & Criteria

The following model is used to rationalize the current market share of the passenger car market in the US. Players in the industry are grouped into categories using originally regional location, because there are many companies in this industry and companies in a group more or less have the same attributes as its group member. Consequently, the alternatives involved here are American car, Asian car, and European car. There are 4 clusters that hav major impact on the decision making of buying a passenger vehicle. I only consider factors in buying new vehicle only, i.e., first hand car, so that this would be consistent with the real market share I derived from the internet. These clusters are Cost, Characteristic, Service, and Others. You can find the description of each clusters in the model in the soft copy. Next in each cluster, three nodes are developed, followed by connexions of nodes that are justified to have relationship both within the same cluster and with the different cluster. Description of each node is also inserted in the model in the file. Below is the picture of the overall model.



Pair-wise comparisons are then built for all those connected nodes. For example, with respect to cost of the vehicle, American car is preferable, then Japanese, and European, respectively. While for the Miles/Gallon aspect, Japanese car is better with American and European car are basically indifferent. As a result, I get unweighted super matrix below,

		1Alternatives			2Cost			3Characteristic		
		1American	2Asian	3European	1Vehicle	2Miles/Gallon	3Parts & Repair	1External look	2Quality of the vehicle	3Safety
1Alternatives	1American	0	0.9	0.9	0.785391	0.134929	0.36665	0.457875	0.121957	0.268368
	2Asian	0.75	0	0.1	0.148815	0.783772	0.582022	0.126007	0.558425	0.117221
	3European	0.25	0.1	0	0.065794	0.081299	0.051328	0.416117	0.319618	0.614411
2Cost	1Vehicle	0.792757	0.546931	0.789062	0	0	0	1	1	1
	2Miles/Gallon	0.131221	0.344544	0.103121	0.5	0	0	0	0	0
	3Parts & Repair	0.076021	0.108525	0.107817	0.5	0	0	0	0	0
3Characteristic	1External look	0.142857	0.08522	0.163424	0.163424	0	0	0	0	0
	2Quality of the vehicle	0.571429	0.644223	0.539614	0.539615	1	1	0.5	0	1
	3Safety	0.285714	0.270557	0.296961	0.296961	0	0	0.5	1	0
4Service	1Availability	0.783772	0.104729	0.157056	0	0	0.333333	0	0.8	0
	2Quality of Services	0.134929	0.636986	0.593634	0	0	0.333333	0	0.2	0
	3Timeliness	0.081299	0.258285	0.24931	0	0	0.333333	0	0	0
5Others	1Dealer Locations	0.466667	0.137853	0.2	1	0	0.25	0	0	0
	2Previous satisfaction	0.066667	0.732429	0.6	0	1	0.75	0	1	1
	3Nationalism	0.466667	0.129718	0.2	0	0	0	0	0	0

		4Service			5Others		
		1Availability	2Quality of Services	3Timeliness	1Dealer Locations	2Previous satisfaction	3Nationalism
1Alternatives	1American	0.814213	0.075057	0.157056	0.80441	0.1365	0.80441
	2Asian	0.113983	0.333216	0.593634	0.121809	0.625013	0.073781
	3European	0.071805	0.591727	0.24931	0.073781	0.238487	0.121809
2Cost	1Vehicle	0	0.75	0	0.888889	0	0
	2Miles/Gallon	0	0	0	0	0.8	0
	3Parts & Repair	0	0.25	1	0.111111	0.2	0
3Characteristic	1External look	0	0	0	0	0.09739	0
	2Quality of the vehicle	1	1	0	0	0.569541	0
	3Safety	0	0	0	0	0.333069	0
4Service	1Availability	0	0.333333	0.5	0.571429	0.104729	0
	2Quality of Services	0	0	0.5	0.285714	0.636986	0
	3Timeliness	0	0.666667	0	0.142857	0.258285	0
5Others	1Dealer Locations	1	0.2	0.8	0	0.333333	0
	2Previous satisfaction	0	0.8	0.2	0	0	0
	3Nationalism	0	0	0	1	0.666667	0

Next, I do the cluster comparion which give me the following cluster metrix.

	1Alternatives	2Cost	3Characteristic	4Service	5Others
1Alternatives	0	0.253877	0.12267	0.576259	0.248427
	0.100005	0.048104	0.033759	0.080671	0.037618
	0.033335	0.021268	0.111482	0.05082	0.022786
2Cost	0.488582	0	0.691006	0	0.169613
	0.080873	0.063076	0	0	0
	0.046853	0.063076	0	0	0.021202
3Characteristic	0.005892	0.083489	0	0	0
	0.023567	0.275675	0.020541	0.120233	0
	0.011783	0.15171	0.020541	0	0
4Service	0.050343	0	0	0	0.040447
	0.008667	0	0	0	0.020224
	0.005222	0	0	0	0.010112
5Others	0.06761	0.039725	0	0.172018	0
	0.009659	0	0	0	0
	0.06761	0	0	0	0.429572

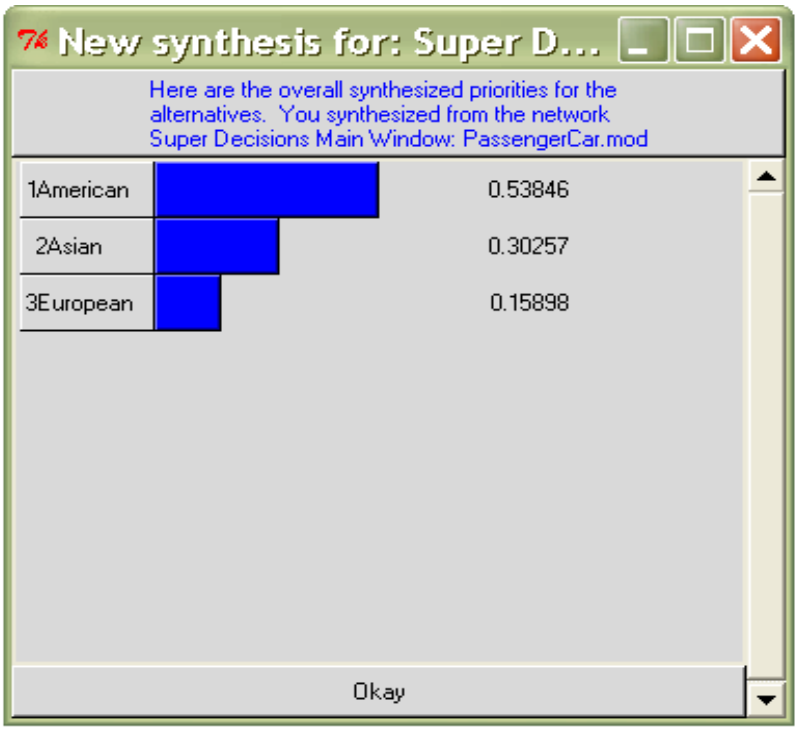
Then with unweighted super matrix and cluster metrix , I can get weighted super matrix. See below.

		1Alternatives			2Cost			3Characteristic		
		1American	2Asian	3European	1Vehicle	2Miles/Gallon	3Parts & Repair	1External look	2Quality of the vehicle	3Safety
1Alternatives	1American	0	0.120007	0.120007	0.253877	0.049912	0.126871	0.12267	0.028019	0.065777
	2Asian	0.100005	0	0.013334	0.048104	0.289929	0.201396	0.033759	0.128296	0.028731
	3European	0.033335	0.013334	0	0.021268	0.030074	0.017761	0.111482	0.073431	0.150591
2Cost	1Vehicle	0.488582	0.337077	0.486304	0	0	0	0.691006	0.592571	0.632169
	2Miles/Gallon	0.080873	0.212345	0.063554	0.063076	0	0	0	0	0
	3Parts & Repair	0.046853	0.066885	0.066449	0.063076	0	0	0	0	0
3Characteristic	1External look	0.005892	0.003515	0.00674	0.083489	0	0	0	0	0
	2Quality of the vehicle	0.023567	0.026569	0.022255	0.275675	0.584626	0.546875	0.020541	0	0.037585
	3Safety	0.011783	0.011158	0.012247	0.15171	0	0	0.020541	0.03523	0
4Service	1Availability	0.050343	0.006727	0.010088	0	0	0.021524	0	0.050111	0
	2Quality of Services	0.008667	0.040915	0.03813	0	0	0.021524	0	0.012528	0
	3Timeliness	0.005222	0.01659	0.016014	0	0	0.021524	0	0	0
5Others	1Dealer Locations	0.06761	0.019972	0.028976	0.039725	0	0.010631	0	0	0
	2Previous satisfaction	0.009659	0.106114	0.086927	0	0.045459	0.031893	0	0.079814	0.085148
	3Nationalism	0.06761	0.018793	0.028976	0	0	0	0	0	0

		4Service			5Others		
		1Availability	2Quality of Services	3Timeliness	1Dealer Locations	2Previous satisfaction	3Nationalism
1Alternatives	1American	0.576259	0.014691	0.031799	0.248427	0.040759	0.80441
	2Asian	0.080671	0.065223	0.120193	0.037618	0.18663	0.073781
	3European	0.05082	0.115823	0.050478	0.022786	0.071213	0.121809
2Cost	1Vehicle	0	0.123627	0	0.169613	0	0
	2Miles/Gallon	0	0	0	0	0.147596	0
	3Parts & Repair	0	0.041209	0.170505	0.021202	0.036899	0
3Characteristic	1External look	0	0	0	0	0.003226	0
	2Quality of the vehicle	0.120233	0.033252	0	0	0.018863	0
	3Safety	0	0	0	0	0.011031	0
4Service	1Availability	0	0.186201	0.288908	0.040447	0.007168	0
	2Quality of Services	0	0	0.288908	0.020224	0.043594	0
	3Timeliness	0	0.372401	0	0.010112	0.017677	0
5Others	1Dealer Locations	0.172018	0.009515	0.039368	0	0.138448	0
	2Previous satisfaction	0	0.038059	0.009842	0	0	0
	3Nationalism	0	0	0	0.429572	0.276896	0

Final result

The market share derived from the model are shown below



This is very much closely to the real market share of passenger car in US in 2000 from US Business Reporter website, http://www.activemedia-guide.com/automrkt_mrkt.htm .

U.S. Passenger Automobile Market - Year 2000	%
General Motors	28.6
Ford Motor Company	19.1
Toyota	11.0
Honda Motor Co.	10.0
Daimler Chrysler	7.3
Volkswagon	4.9
Nissan	4.8
Hyundai	2.6
Other	11.7

If the Big Three, GM, Ford, and Daimler Chrysler, are grouped together to represent market share of American car, the result would be 28.6+19.1+7.3 = 55%, or off from the model by 1.16%; Toyota, Honda, Nissan, and Hyundai together as Japanese car would yield 11+10+4.8+2.6 = 28.4%, off from the model by 1.86%; finally, Volkswagen and other as European car would result in 4.9+11.7 = 16.6, or off from the model by 0.7%. It is reasonable to include "Other" or major part of it in European car category, since if we think of other popular brands which are not shown in the above list, we would come up with mostly European brand, such as BMW, Mercedes Benz, Volvo, Audi, Fiat, Peugoet, Raynault, etc. For 1.86% off from Japanese car market share can be mitigated by the fact that two of the well-known brands, Mitsubishi and Mazda, is not included.

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